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FORESTRY AMONG THE REDWOODS

FOREST TAXATION

TREE FELLING AS A SPORT

THE WOODPECKERS

GEORGIA'S HARDWOOD FOREST PROBLEM

GARDEN LORE

The American Forestry Association

Washington, D. C.

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IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watershed; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people, that the census of 1912 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 785,000 people; pay $367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions, that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon National and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

National and State Forests under Federal and State Ownership, administration and management, respectively; adequate appropriations for their care and management; Federal co-operation with the State, especially in forest fire protection.

State activity by acquirement of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners, non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal, State and fire protective agencies, and encouragement and extension individually and by co-operation; without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquirement of waste lands for this purpose, and also planting by private owners, where profitable, and encouragement of natural regeneration.

Forest Taxation Reforms removing unjust burdens from owners of growing timber.

Closer Utilization in logging and manufacturing without loss to owners; aid to lumbermen in achieving this.

Cutting of Mature Timber where and as the domestic market demands it except on areas maintained for park or scenic purposes, and compensation of forest owners for loss suffered through protection of watersheds, or on behalf of any public interest.

Equal protection to the lumber industry and to public interests in legislation affecting private timberland operations, recognizing that lumbering is as legitimate and necessary as the forests themselves.

Classification by experts of lands best suited for farming and those best suited for forestry; and liberal National and State appropriations for this work.

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AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

WASHINGTON, D. C.

PERCIVAL SHELDON RIDSDALE, Editor

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CHANGE OF ADDRESS

A request for change of address must reach us at least thirty days before the date of the issue with which it is to take effect. Be sure to give your old address as well as the new one.

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The 3-way corner, efficient bracing, and improved skids make this crate a better protector of contents than the one opposite. The new crate saves material and labor. It requires 18% less lumber. It is made with only 26 pieces of material; the old crate required the cutting and fitting of 37 pieces.

This crate was formerly used by an American manufacturer for packing a piece of heavy machinery. This shipper, alert to the possibilities of reducing damage to goods in transit and of rendering better service to his customers, sought the co-operation of a Weyerhaeuser crating engineer. The better crate opposite was evolved.

Do *Claims* Compensate for *Damaged Freight?*

A DEALER has waited several weeks for a shipment ordered by wire. His customer is patient but insists that the delay is proving costly.

The goods finally arrive—in badly damaged condition. More delays and disappointments.

A claim can be filed against the railroad, but arguments and damage claims are poor substitutes for goods sorely needed.

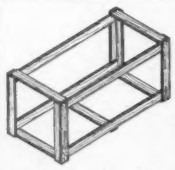
THE mere monetary loss involved in a freight claim is but one chapter in the story of damaged freight. That priceless adjunct of a growing business, the good will of the dealer and his customer, is impaired.

That is why broad-visioned executives in all lines of business are investigating the subject of better packing. They are looking to their shipping departments as one means of reducing the percentage of customer turnover. Using safe packing as a new selling tool, as another aid in outstripping competition, and as a creator of good will.

THROUGH the redesigning of crates and changes in packing methods, damage to goods in transit can be materially reduced. At the same time substantial savings can often be effected through reduction in packing costs and transportation charges.

One shipper, who uses 300 cars of crating lumber annually, reports that, through the co-operation of a Weyerhaeuser crating engineer, he is now saving 25% of the lumber formerly required for one of his crates, and 18% on another; another shipper states that, through the use of a lighter species of lumber and a new design, he has reduced the shipping weight of one item sufficiently to effect an annual saving of $10,000 in freight charges alone.

Every day Weyerhaeuser crating engineers are on the job showing shippers how to prevent shipping losses, and in many cases pointing out large savings that can be made in their packing practices.



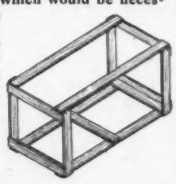
Frequently, crates that appear sound to the casual observer, fail in action because certain hazards of transportation have been overlooked or disregarded in the crate design.

The drawing shown above was made from a photograph of a standard crate used by a manufacturer in shipping an article weighing several hundred pounds. A visit to any warehouse or freight depot quickly discloses the fact that very heavy packages are seldom lifted; they are usually dragged or skidded. The bottom of this crate is such that the crate cannot be pushed or dragged across the floor without danger of tearing loose some of the frame members, with probable consequent damage to the contents.

Chance for damage from this particular hazard has been eliminated in the redesigned crate shown below. Note that two bottom members extend the full length of the crate and provide a surface on which the crate may be skidded without danger of loosened nails or frame members.

The addition of the three-way or lock corner and the elimination of end-grain nailing have increased the strength and rigidity of the crate. The revised design also makes possible a slight saving in lumber.

These drawings show the crate bottom and frame only. The diagonal bracing and internal blocking which would be necessary to reproduce the complete design in either case have been omitted in these drawings for the sake of simplicity.



Make Every Month Perfect Package Month

WITHOUT obligation or cost to you, a Weyerhaeuser practical crating engineer will come to your plant, and with the co-operation of your shipping department, redesign your shipping containers to fit the product to be packed.

Lumber is the standard material for shipping containers. For this purpose, this organization offers to factory and industrial buyers, from its fifteen distributing points, ten different kinds of lumber of uniform quality and in quantities adequate to any shipper's needs.

A booklet, "Better Crating," which outlines the principles of crate construction and explains the personal service of the Weyerhaeuser engineers, will be sent on request to any manufacturer who uses crating lumber.

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AMERICAN FORESTRY

VOL. 28 NOVEMBER, 1922 No. 347

FORESTRY AMONG THE GIANTS

By Woodbridge Metcalf

Associate Professor of Forestry, University of California

WHEN the average person is asked to think about California and what he has heard or read about the wonders of the golden state, I presume that nine out of ten will mention the redwood tree among the first three things. So famous have those great trees become because of their age and massive proportions that most people would not consider a trip to California complete unless they had seen a grove of either the big-tree of the Sierras or the redwood of the coast, and many people have travelled from the ends of the earth in order to walk amid the great trunks while they strove to comprehend the marvels of these most ancient of living things. All of the other important western timber trees are found in several states but to California alone has been given the coast redwood and the giant big-tree. So indelibly has the image of the redwood tree become interwoven with the name California in history, song and story that it might well be emblazoned on the state flag instead of the grizzly bear. That ferocious monarch of the bear family has not been seen in California in a generation while King Sequoia will probably continue to rule over the sylvan slopes of the west coast, exacting homage from men and trees alike, for untold future generations. And it is not only the old patriarchs that will thus rule, but millions of their descendents will arise to uphold the honor of their ancient lineage and have a part in moulding the forest destiny of the ultimate west. The following discussion has to do only with the coast redwood (*Sequoia sempervirens*) which is entirely distinct both in range and characteristics from the Sierra big-tree (*Sequoia gigantea*).

AMONG THE GIANTS IN BULL CREEK FLAT, HUMBOLDT COUNTY. THIS IS SAID TO BE THE FINEST GROVE OF REDWOODS NOW STANDING. SINGLE ACRES OF TIMBER SUCH AS THIS HAVE YIELDED OVER A MILLION BOARD FEET BY ACTUAL SCALE.

When after the gold rush of '49 there came a demand for lumber the great stands of redwood stretching from San Francisco Bay north along the coast a few miles across the Oregon line, and south to Monterey County, soon attracted attention, and logging began with the crude implements available in that early day. Recent estimates lead us to believe that at that time there were about a million four hundred thousand acres of redwood timberland containing in the neighborhood of one hundred billion board feet of timber. No one in those early days had any definite idea how much redwood timber there was. That there was enough was evident and the matter of ownership being a trivial matter, several small mills started cutting along the accessible river bottom flats in Sonoma and Mendocino counties. When Uncle Sam got around to it many years later he collected a tidy sum for timber cut on his lands in trespass—but that, of course, is another story.

The days of early logging and settlement in the redwood region were full of action and many stirring tales of those days have been handed down concerning them. One of these has to do with the origin of the name of Bull Creek, in Humboldt County, which has become famous in recent years because the flats adjacent to its banks are said to contain the finest stand of redwoods now extant. The story as told to me by the son of one of the chief actors in the episode begins with the importation by one

of the settlers living on the Eel River of a small herd of cattle. These were secured at great expense from San Francisco and driven with difficulty over rough mountain trails to the settlement. Presiding over the herd was a bull of generous proportions and lengthy ancestry which soon became the pride of the settlement. The coast Indians in the vicinity were not very friendly to the new settlers and, regarding the bull as a fit subject for a grand feast, a band of about thirty of them stole a march on the settlement one dark night and made off with the bull which they killed without ceremony and carried to the depths of the big woods. The settlers on discovering the loss armed themselves and took up the trail with their hearts thirsting for vengeance. They came upon the barbecue while the feast was at its height, the place selected by the Indians being the banks of the little creek under the shade of the mighty trees. The whites attacked without waiting for the end of the feast and the Indians, being taken by surprise, and naturally at a disadvantage because of the heartiness of their meal, were slain to the last man. Henceforth the creek was known by its present name, but it is hard for one walking through this magnificent grove in these peaceful days to think of it as the setting for such a bloody tragedy. Although this grove is privately owned and in close proximity to logging operations, it is possible that it may yet be purchased and preserved in its present state through the efforts of the "Save the Redwoods League."

REDWOOD SECOND GROWTH FORMS A DELIGHTFUL SETTING FOR SUMMER COTTAGES AND HOTELS ALONG THE RUSSIAN RIVER WHICH IS ONE OF THE MOST POPULAR RECREATION AREAS IN CALIFORNIA.

The logging and milling along the coast in the 70's and 80's was very crude compared with present day machinery and methods. The slow plodding bull teams furnished the power for hauling the logs a short distance to the bank of the stream into which they were rolled, to lie, sometimes, for several years until a flood of high water would come. Then there would be a period of feverish activity until all the logs were safely floated down to the mill. A pocket boom of logs chained together spanned the river near its mouth in order to catch and hold the logs as they came down with the current. Sometimes during a year of extra high water the pressure of the mass of logs and the swirling current became too much for the boom to hold and the logs, representing years of labor and millions of feet of timber, would be swept out into the ocean. This occurred at least once on each of the rivers running through the redwood region and the battered remnantts of logs lying half buried in the sand along hundreds of miles of ocean beach are mute evidence to this day of such catastrophes.

The bull teams could not handle the butt logs of the largest trees so it was common practice to build a staging ten to fifteen feet high around the trees for the fallers to stand on. So high were some of these stumps left that I recently saw two of them used as platforms for summer cottage water tanks. The cottage stood beside the stump and the top of the tank was well over the peak of the cottage roof. Even after leaving such high stumps, butt logs would often offer too big a problem for the bull teams so that a section, twenty or more feet long, had to be left where it fell. It is said that some of the early logging on the Russian River was done before double bitted axes or crosscut saws of sufficient length were available, the trees being chopped clear through with pole axes. I have seen stumps over ten feet in diameter with axe marks clear across and could not help marvelling at the patience and apparent dexterity of these woodsmen of an earlier day. Many of the logs which reached the mill pond were too large for the machinery and had to be split open with powder before they could be handled.

The size of these logs brings to mind the matter of maximum size of trees and the maximum yields per acre on record. There are many stories current about the size of this or that tree and it seems probable that there have been trees over 25 feet in diameter and about 375 feet in height, but at the present time trees over 16 feet in diameter are very scarce and hard to find. The largest tree in Bull Creek Flat is just over 16 feet at 4½ feet from the ground, but there must have been larger trees along the lower Eel River and on the flats adjacent to Humboldt Bay. Mr. Ivon Clar, of Guerneville, Sonoma County, tells me that there is a stump near that town which measures over 24 feet across and

that he knows of at least two other trees cut in that vicinity which were between 21 and 22 feet in diameter. According to Mr. Clar the largest tree now standing in Sonoma County is located on what is known as Eagle Nest Flat, about four miles from Guerneville. He says that about twenty years ago he assisted a member of the faculty of the University of California to measure the tree. According to those measurements, of which he kept a copy, the tree was 357 feet high and 20 feet in diameter. The bole is not symmetrical but measured 22 feet in one direction and 18 feet in the other. The tree was at that time perfectly healthy but started to die at the top about 1910. It is still alive except for the upper half of the crown and will probably live for many years. Adjacent to it is another old tree from which the flat takes its name. The earliest settlers on the Russian River remarked a large nest in its top in which a pair of ospreys, or fish eagles, annually reared their brood. About 1890 during logging operations a neighboring tree struck it in falling, demolishing the nest and breaking off thirty feet of the top of the tree. The eagles built the nest up again the following year and used it undisturbed until April, 1906, when the earthquake shook the tree so hard that the nest was shaken to pieces. Again the eagles built it up and today the Eagle nest tree and its stag-headed companion are familiar landmarks to all who go up and down the Russian River.

REDWOOD CUT-OVER LAND ABOUT A YEAR AFTER THE REMOVAL OF LOGS. CLUMPS OF SPROUTS ARE COMING UP AROUND THE OLD STUMPS BUT ARE TOO FAR APART TO PRODUCE CLEAR LUMBER. PLANTING EXPERIMENTS ARE BEING CARRIED ON WITHIN THE AREA SHOWN.

Stories of remarkable yields per acre are told about various sections of the redwood region and records close to or slightly in excess of one million board feet are quoted. The Pacific Lumber Company scaled an acre near Dyarville about a year ago which exceeded a million feet and there were probably many similar acres cut in the early days. One of the most interesting records of this kind is vouched for by John Armstrong, of Guerneville who scaled timber at various points along the coast in the eighties. I have the story through Mr. I. M. Clar, mentioned above. It seems that about 1885 Armstrong was scaling for Mr. George Guerne who owned and was logging a particularly fine redwood flat about a mile from what is now Guerneville. Mr. Guerne had an argument with one of his friends as to whether the timber would run more or less than 750,000 feet per acre. Finally a wager was made, the loser to pay for a champagne supper at the famous old Poodle Dog Restaurant in San Francisco, and Armstrong was instructed to carefully measure off an acre and scale the logs which were cut from it. This he did, following the practice in those days of scaling each log inside the sap wood which was not considered of any value. He says that the total scale for this acre was 1,287,000 board feet and he believes it to have been the heaviest stand of timber anywhere on the Pacific Coast. The record is apparently authentic and when one considers that this is a log scale and not a stump scale the figure is still more astonishing.

DOUGLAS FIR SEED TREES LEFT ALONG THE TOP OF A RIDGE IN MENDOCINO COUNTY IN AN ATTEMPT TO GET NATURAL REPRODUCTION OF THIS SPECIES BETWEEN THE CLUMPS OF REDWOOD SPROUTS. THESE TREES AVERAGE OVER 2 FEET IN DIAMETER AND HAVE SUCCESSFULLY SURVIVED THE LOGGING FIRE AND SEVERE WINDS OF THEIR FIRST WINTER OF ISOLATION.

Mr. T. W. Hine, of the Holmes Eureka Lumber Company, has a unique record which shows the log scale for a tree which they cut some years ago on Happy Camp flat near Eureka. This tree was about fifteen feet in diameter, very tall, perfectly sound and the completed log scale was 118,000 board feet. Mr. Hine recalls another tree on this flat which was 22 feet in diameter at the stump and says that the first four logs were so heavy that they were split in quarters, each quarter making a car load. Another tree in the vicinity yielded 252 feet in length of logs before getting into the crown where it was too knotty to make good lumber. Mr. Hine says that the Hammond Lumber Company cut a tree some years ago which scaled much more than his big one mentioned above. He is under the impression that the scale was about 160,000 board feet but the figures are not available. A section of the 22 foot tree was sent to the Chicago World's Fair where it created a great sensation. If any of my readers have difficulty in visualizing the size of these logs and trees I suggest that they lay off a 22 foot distance across the front of an ordinary cottage and compare the height with some tall city building with which they are familiar. Then if they doubt the evidence of their senses I must ask them to remember that we are talking about Sequoia, the King of trees.

A CIRCLE OF REDWOOD SPROUTS ON EAGLE NEST FLAT, RUSSIAN RIVER, 45 YEARS OLD. THE CIRCLE ABOUT THE OLD STUMP CONTAINS EIGHT FINE TREES.

Logging in the redwood region did not long remain in the primitive condition mentioned above. Bull teams gave way by gradual stages to the Dolbeer donkey engine and the narrow gauge railroad, while band saw mills of large capacity replaced the small circular outfits. More and more people attracted by the size and accessibility of the timber filed on the land so that the entire acreage soon passed from the public domain to private ownership. With the increasing demand for lumber the companies have enlarged the scope of their operations and have installed the most up-to-date logging, transportation and mill machinery, while the zone of operations has moved north from San Francisco bay until it now centers in Mendocino and Humboldt counties. The annual output of the region is now about six hundred million board feet and with widening markets the demand is ever more insistent that the product of the whirring saws be increased. A vast area of cut-over land in all stages of growth, or lack of growth, stretches to the south and along the coast. Fully a third of the original forest area has been combed with ax and saw and as one travels through these cut-over areas he is struck by the fact that with the introduction of high speed machinery and modern methods of utilization, it is becoming increasingly difficult if not impossible for nature, unaided, to reforest them with an adequate stand of second growth.

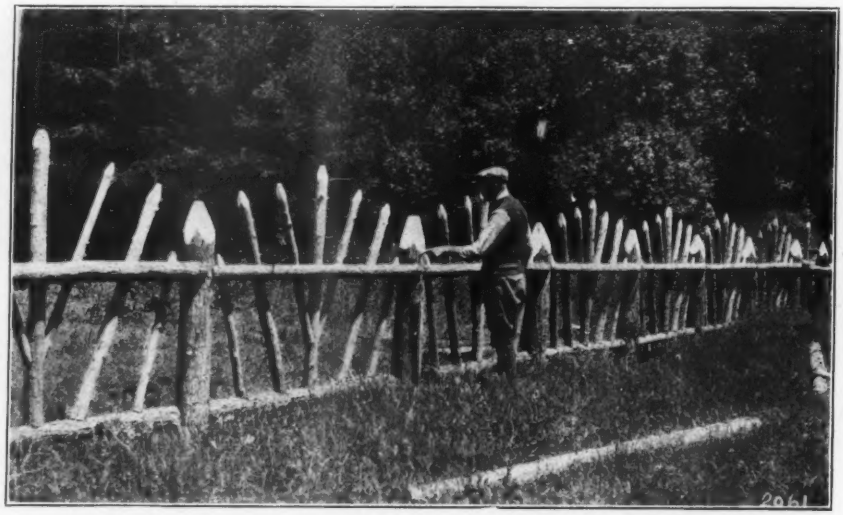
About seventy billion board feet of virgin redwood on some nine hundred thousand acres still remain to be cut and conservative estimates lead us to believe that this will last about seventy-five years. And I think I can hear you ask: "After that, what?" "Are we to look forward to seeing vast stretches of desolate, fire-swept, unproductive cut-over lands and a dead lumber industry in the land of the giants?" "Will fertile farm and grazing lands be developed where once the redwoods towered or will these lands always produce under wise management the timber crop for which they are now so justly famous?" A good many serious minded and far seeing men both in and out of the lumber business have been asking those questions for several years; the Forestry Division of the University of California has been working on the problem and a majority of the redwood operating companies have joined forces and retained no less an authority on forest management and economics than Major D. T. Mason of Portland, Oregon, to draw up tentative plans for the future management of these lands. The problem is a large one and acquires added interest and significance because the land is all in private ownership, which means that aside from the rather remote possibility of extensive acquirement of cut-over lands by the state, measures to insure the perpetuation of the industry must be worked out by the operating companies. One of these has already adopted the principle of permanent timber production on its lands and if the others do likewise, as at present appears probable, the redwood region will in a short time present to the world the largest demonstration of forest management by private individuals.

Many phases of the problem are still to be investigated but enough observations have been made to warrant the belief that intensive forest management on redwood lands will probably yield larger and quicker returns than is possible with any other coniferous tree. It is in order to present a few of the salient facts leading to this conclusion that the following pages have been written. These will be presented as briefly and entertainingly as possible with no apology for the few necessary figures.

The story of redwood reproduction reads like a fairy tale because among all the softwood timbers of the world this species alone has the ability to sprout consistently and profusely from the stump. In fact so well developed is this tendency and so vigorous are the sprouts that probably eighty per cent of the trees in virgin redwood stands got their start in life in this manner. Stumps retain the sprouting capacity to a surprising age and a goodly proportion of even the oldest trees will sprout vigorously after being cut. The stumps moreover are wonderfully tenacious of life and will continue to send up vigorous green shoots in spite of repeated discouraging setbacks from successive fires or clearings with the ax. So serious a problem are these sprouts in the attempt to clear redwood lands for agriculture or grazing, that many a man has given up in despair after waging a losing battle for 10 years or more against these persistent and rapidly growing sprouts. Even the hottest fire used in clearing logging slash kills but a fraction of the stumps and a newly logged area which appears to the uninitiated to be hopelessly devastated will within a very few months be thickly dotted with bright green clumps of sprouts encircling nearly every stump. Usually several hundred and sometimes more than a thousand of these suckers push up in a circle from the root collar of the stump and engage immediately in a battle royal to determine which eight or ten will be the ultimate survivors of all this group of starters. Some suckers also arise from surface roots at a distance from the stumps and in very exceptional cases a few seedlings may start immediately and so result in a complete stand of young trees. Such fully stocked stands of reproduction are of exceedingly rare occurrence because of the prevalence of fires in cut-over areas in past years, but enough have been ferreted out and measured during the past year to indicate that where given adequate protection they grow with astonishing rapidity. The writer had the pleasure of laying out and measuring, with the assistance of E. Fritz, a full acre sample plot in such a stand on the banks of Big River, Mendocino County, last July. We walked down the bank of the stream from the Mendocino Lumber Company camp, where we were stopping, a distance of about three or four miles, across deserted clearings where old lumber camps or homestead cabins had once stood, and through patches of second growth in different stages of development and density. Some of these stands showed severe damage by fire; others were very open in character owing to the distance apart that the old trees had stood and the lack of reproduction between the circles of sprouts, but finally we entered a stand the density of which was in startling contrast to the brilliant sunshine outside. It was like going from a sunny street into the door of a dimly lighted cathedral. When our eyes became accustomed to the dim light we could scarcely believe that they were not playing us false, for the trees about us were so large and beautifully formed it seemed that they must be more than mere second growth. But here and there amid unmistakable circles were the massive stumps characteristic of the early day logging and we knew that we had reached the spot we were looking for. As we ran out lines around the sample acre and then sat down to eat our lunch first one and then another would exclaim over the density and wonderful beauty of this stand of young trees, but it was not until we had finished measuring diameters and heights and determined the age to be 48 years, that the full wonder of it was impressed upon us. The tally sheets at the end of the afternoon showed that we had measured 263 trees on that acre which averaged 125 feet in height and 24 inches in diameter breast high. The tallest trees were over 150 feet in height and a few were just over three feet in diameter breast high. In addition to the above there were also recorded five

REDWOOD IN FULLY STOCKED STANDS GROWS MORE RAPIDLY IN VOLUME THAN ANY OTHER SOFTWOOD TREE IN THE WORLD. THE TREES IN THIS 48-YEAR-OLD STAND AVERAGED 24 INCHES IN DIAMETER AND 125 FEET IN HEIGHT. AN ACRE MEASURED HERE CONTAINS OVER 137,000 BOARD FEET OF LUMBER AND HAS COME TO BE KNOWN AS THE "WONDER SAMPLE PLOT."

old growth redwoods, about four feet in diameter, which had been left during the old logging operations, and 10 red alders varying from 10 to 18 inches d. b. h. I shall never forget the afternoon among those trees for computations have since shown them to have made the fastest growth in volume of any stand of softwood timber in the world. Since then a number of other plots have been measured which confirm the above figures and demonstrate the remarkable rapidity of growth of young redwood but none of these quite came up to the above record. As I had the pleasure of "discovering" the Big River plot I hope it shall continue to be the greatest, but I would not be surprised to hear that someone had measured a plot within the region which slightly exceeded this one in yield. It has come to be known among California foresters as the "Wonder Sample Plot" and with good reason, for calculations of its volume based on future utilization to a five inch top, show a total of 137,416 board feet by the International Log Rule, or approximately 22,000 cubic feet of wood inside bark. Please remember that this includes only the second growth trees and that they were *only* 48 *years old* which means an average *annual* growth of 2660 board feet per acre. In other words the volume growth per acre per year was 460 cubic feet, or a little over five standard cords without bark.



REDWOOD SECOND GROWTH IS COMING TO BE USED IN A VARIETY OF WAYS, AMONG WHICH THIS FENCE IS RATHER A BIZARRE EXAMPLE.

Some readers who are familiar only with tree growth in less favored regions may exclaim, "What rubbish," or put this down as "Just another one of those California exaggerations," and I will confess that when I think of the days I spent in the north woods among the black-spruce, tamarack and jack-pine, I find the figures doubly hard to believe.

A few days ago I was looking over, with Professor Bruce, a recent Swedish publication which gave figures on yields per acre in some of their splendid and intensively managed stands. We both had to rub our eyes a bit in wonder when we found the best of these to be only slightly higher in yield than the poorest fully stocked stand of second growth redwood we have so far been able to find.

The table on the following page gives a summary of the Big River sample plot for those who may be interested in more detailed figures. Photographs made at the time indicate the density of the stand but do small justice to the beauty and symmetry of the trees. Careful examination of the photograph will reveal a large stump in the left foreground and a "mud-line" about seven feet from the ground on all the trees. The spring of 1921 was a period of exceptionally high water and this flat was innundated for a period of about ten days.

Redwood seedlings are exceedingly rare and hard to find either in mature stands of timber or on cut over lands. Many people claim to have travelled through redwood areas for years without ever finding a tree that they could be sure originated from seed, which has given rise to a rather wide-spread popular belief that the trees never reproduce in this way. It does take a lot of careful searching to find seedling redwoods in most parts of the region, but where conditions are favorable they may occasionally be found in considerable numbers. I have found areas of several hundred square feet where there were two or more seedlings per square foot but soil and moisture conditions must apparently be just right at the time seeds are cast and for some months thereafter. Bare mineral soil of sandy loam texture apparently furnishes ideal conditions for germination and growth of the little trees and they can often be found on the sides of railroad cuts and fills where seed trees are near. A little patch of seedlings can occasionally be found under an old stand on the mound of earth left heaped up by an old wind-thrown tree, and I have seen them growing in loam which had collected on top of stumps or in old rotting logs.

Nevertheless redwood seedlings are rare and the writer became interested some years ago in determining why they were so scarce in natural stands and also if they could be grown successfully in quantity in the nursery. Experiments with various lots of seed have been carried on in the laboratory and forest nursery at Berkeley and in spite of early failures, it has been demonstrated that under the proper conditions redwood can be grown from seed as quickly and easily as can any other forest tree. The early failures resulted, I believe, because the seed was collected from very old trees (ring counts showed them to be 1000 years and over) while

BIG RIVER REDWOOD SAMPLE PLOT

Area, 1 acre. Age 48 years. Mendocino Co. Calif.
Measured June, 1921
Site Quality I.—river flat with deep alluvial soil.

Tree classes based on d. b. h. inches	Number of trees per acre	Board ft. volume International rule
2- 9	48	556
10-19	115	30,432
20-29	83	75,914
30-37	17	30,514
Total	263	137,416

Basal area outside bark at d. b. h. 515 square feet.
Basal area inside bark at d. b. h. 400 square feet.
Total height of average tree, 125 feet.
Average height of dominant trees, total, 140 feet.
Cubic feet of wood inside bark using form factor 0.44—22,000.
Mean annual growth for 48 years, 460 cu. ft. or 2,660 board ft.

The following trees recorded but not included in calculations
Five older redwoods – – – – – – 40″—52″ d. b. h.
Ten red alders – – – – – – – 10″—18″ d. b. h.

most of the more recent tests on seed from younger trees have given reasonably good results. Viable seed is produced by very young trees—tests last year on seed from sprouts 7 and 10 years old, germinated 2% and 16% respectively—and present indications are that the best seed comes from trees between the ages of 30 and 100 years.

Redwood cones seem to be produced in great profusion by trees of all ages. They are small (usually less than ¾″ long) bright green in color and require but one season to mature. They should be collected when they are just about to open to expel the tiny red-brown seeds, the time varying with locality and climatic conditions from late August to early December. When collected it takes four hundred to eight hundred cones to weigh a pound; about 15% of this weight being seed. Each cone may contain a hundred or more seeds which are surrounded by tiny glistening specks of dark red resin which, with other chaff, sometimes makes up over 25% of the weight of the material extracted from the cones. The seeds are very small, the number per pound varying with different samples from less than 100,000 to more than 300,000 and it is very hard for one to realize that such mighty forest trees are able to develop from the atom of life contained in one of the tiny packages. A good average pound of redwood seed if carefully extracted should contain not over 5% chaff or resin and about 125,000 to 150,000 clean seeds with a germinative capacity of 15 to 30% as indicated by cutting or oven tests. This means that in this pound there are from 18,750 to 45,000 seed capable of germinating, and it might appear that we could expect to get this number of trees from planting it in the nursery. In actual practice, however, there is a very large loss after germination, of trees which are too weak to become established and those which die during the first few months from a variety of causes. In order to arrive at the probable number surviving at the end of the season from this pound we must divide the above figures by from 3 to 5 depending on the germination percent, which will leave from 4,000 to 15,000 seedlings.

Seed can be sown in out of door seedbeds at Berkeley any time from November to April. There are, however, decided advantages in fall or winter over spring sowing as seedlings from the former develop rapidly and, with average weather conditions, most of them should be large enough for field planting when one year old. Seed sown in the late spring produces trees which are mostly less than three inches high the next rainy season. About 10% can be used in field planting but the rest must be set out in transplant rows for another season. After this many of them will be 12″ or over in height and therefore more expensive to handle in field planting. Stock from April sown seed is so small at the time of transplanting that it is necessary to figure on a 15 to 20% loss during this operation.

AN EXPERIMENTAL PLANTATION ON THE SITE OF AN OLD LOGGING CAMP. A NUMBER OF NATIVE AND INTRODUCED SPECIES ARE BEING TRIED OUT BY THE UNION LUMBER COMPANY.

An interesting and very significant characteristic of young redwood trees was discovered last December when a lot of two year old transplants were taken up

for field planting. A majority of these were found with a pronounced swelling below the ground level from which projected ten to fifteen fully developed buds capable of growing immediately into sprouts should anything happen to the leader. It is thus demonstrated that sprouting capacity is inherent even in seedlings less than two years old, to be drawn on immeditaely in case of emergency. Because of this trait a light surface fire in a young plantation would probably not result in total loss as with most species. Also because of this it may be possible to severely prune transplants which have become too large for convenient handling in the field. Both of these points will be of considerable importance in future forestry work in the redwood region.

It is quite simple under greenhouse conditions to reproduce redwood by means of cuttings from the tops of branches or large sprouts. Such cuttings four to eight inches long if made in the fall and placed in coarse bench sand will show about 25% survival in seven months. Most of these survivors show a heavy callous at the lower end of the cutting, with roots two to six inches in length, and well developed buds or new green growth. It is not known as yet whether this class of stock can be grown cheaply enough in quantity to compete with seedlings or, what is more problematical if they will develop into well formed and rapid growing trees. Another characteristic of these remarkable trees which may prove to be of great importance was discovered last December by C. O. Gerhardy, U. C., '21. In digging up a number of suckers for experimental planting he found it not uncommon for some of these to show well developed fibrous roots of their own. In many cases, especially where they arise from a long surface root, these "suckers" can be detached with the new roots intact, furnishing what I have playfully called "automatic planting stock." A number of these are being tested out this year by the Union Lumber Company on several different planting sites. Tests with a small number of these at Berkeley show 25 to 30% alive and making some new growth after six months in the ground.

REDWOOD PLANTATION

Age 30 Years

Chico Forestry Station, Butte County, California.

Spacing 16x16 feet—170 trees per acre.
Area .223 acres—86% survival.
Average D. B. H.—15.3 inches.
Average height—68 feet.
Maximum D. B. H.—28.9 inches.
Maximum Height—98 feet.
Basal area per acre—219 cubic feet.
Cubic ft. vol. per acre—5270 cubic feet equals 175.6 cubic feet per acre per year.
Board ft. vol. per acre—31,400 equals 1046 board feet per acre per year.

Of all these possibilities for use in reforestation work probably only one or two will prove feasible after extensive trial. The number of promising leads seems to give promise that one or more will be developed on a large scale to supply the demand for planting stock that will be very pronounced, according to my way of thinking, within a few years.

Only a limited number of redwoods have been planted in the past and most of these have been single specimens or groups on lawns or in parks. It does not seem reasonable to suppose that the growth of seedlings when once established will be materially different from that of a fully stocked stand of sprouts on a similar site. The two examples which are given seem to bear out this statement and they are about the only groups of redwoods, the history of which is known, that are old enough to be of interest.

This plantation is located in the north Sacramento valley where hot dry summers and absence of fogs make the climate very different from that found in the redwood belt. It is therefore significant of the wide range of climatic conditions under which these trees will thrive and grow rapidly in volume. It should be noted that the soil was a moderately fertile gravelly loam, with good sub irrigation all the year from Big Chico Creek which flows past the plantation about 50 yards distant. All calculations in the above were made exactly the same as in the Big River plot.

There are three small groups of redwoods on the University campus at Berkeley which were raised from seed collected near Willits in 1904 and planted in 1906. Two of the groups are on good bottom land soil, the other on observatory knoll where the soil is shallow and stony. The difference in site has more than been made up in irrigation which the trees on the knoll received more frequently than the others. There are in all 44 trees which averaged at 15 years from date of planting 10.7 inches D. B. H. and 37 feet high. No calculations of volume per acre would be significant but it will be noted from the following comparison of annual growth that these trees have been doing reasonably well.

		Mean annual growth	
		D. B. H.	Height
Plot	Age	inches	feet
Big River	48	0.50	2.60
Chico Station ...	30	0.51	2.26
Berkeley	15	0.71	2.46

Planting experiments in the Berkeley hills, which have been carried on for several years, show about 50% survival for seedling stock and 75-80% for transplant stock under conditions including heavy adobe soil with a dense grass cover which could be considered as typical of only the most unfavorable planting sites within the redwood belt. From the examples quoted it seems reasonable to conclude that growing and planting redwood should be at least as cheap and successful as it has been with any other important coniferous tree.

Having demonstrated the feasibility of raising and planting redwood someone will be sure to ask, "But why all this talk about planting? With the number of

sprouts which come up naturally after logging, is it necessary, and is anyone going to be interested in doing any?" And someone else may inquire "How about agricultural or other uses for some of this land?"

In order to give a proper perspective to the first question I will try to answer the second one first.

Probable Future Use of Redwood Lands

Agriculture of all kinds	140,000 acres
Barrens, rocky areas and brush-fields	280,000 acres
Recreational areas including state and national parks, public playgrounds and summer home sites	80,000 acres
Land suited only for timber production	900,000 acres
Total	1,400,000 acres

In order that we may have some general notion of what land in the redwood region will be used for, I have set down the appended figures. These are believed to be conservative and although necessarily only approximations they do bring out the overwhelming importance of timber production.

Redwood stump land is difficult and very expensive to clear. Most of the land lies on steep hillsides from which the coarse textured soil erodes rapidly under cultivation. Climatic and soil conditions are not conducive to a high yield per acre of agricultural products. Only 18 per cent of the land cut over to date has been devoted to farm purposes. Professor W. T. Clark, who has given much thought to the agricultural possibilities of redwood lands, points out such serious obstacles to successful fruit growing as oak root fungus and flat headed borer (both of which are ever present on tan bark oak) and emphasizes the lack of transportation facilities resulting from the broken character of the topography. Some of the best dairy land in the world is to be found on the flats along the lower Eel River but most of this was not redwood but spruce land and practically all of it is already improved. Grazing on hill lands is largely an unknown quantity as yet but judging from the experience of one or two companies who have tried it rather extensively the returns do not look promising as compared with timber production.

Conservative estimates place 10% of the total area as the absolute maximum that will ever be used for agriculture. Even this will be dependent on permanent timber production on forest lands in order to make a profitable market for agricultural products. Forestry and agriculture must go hand in hand to develop the resources of the region most extensively.

These figures allow for over 50% increase in the present agricultural area and contemplate extensive future recreational development. The barren area is made so large because of much of the older cut-over land. Reforestation on part of this may be feasible at some time in the future.

And now we come to the answer to that first question. Here are nearly a million acres of land so favorably situated as regards mildness of climate and adequacy of moisture, that it will grow softwood timber more quickly than any area of similar size in the world. Because of high humidity fire protection is less of a problem here than anywhere in the west. This means a high degree of security for investments in growing timber. Natural reproduction of sprouts comes up after logging in such a manner as to take care of 1/3 to 1/2 of each acre, but under present methods of logging this must be supplemented in order to obtain a fully stocked stand. Unless stands are fully stocked they will have nothing like the quantity or quality of timber that is possible when enough trees are present. These supplementary trees must be provided for in one of two ways. Either logging methods must be modified so as to leave a sufficient number of seed trees per acre which is at best a doubtful silvicultural measure and well nigh impossible when high speed logging machinery is used, or the trees must be raised artificially and planted. The latter seems to me by far the most reasonable course to pursue. After logging, the land is in ideal condi-

LOOKING ACROSS THE ROWS OF REDWOOD LOGS USED FOR SEATS TOWARDS THE STAGE IN THE OPEN-AIR THEATRE, BOHEMIAN GROVE, RUSSIAN RIVER. THE TREES IN THIS FINE OLD GROVE ARE MAINTAINED AS A SETTING FOR THE ANNUAL GROVE PLAY GIVEN HERE EACH YEAR DURING JULY.

tion for setting out the trees which can be spaced exactly where they are desired and at a very reasonable cost. Because the planting is supplemental to natural reproduction, only five or six hundred trees per acre will be needed instead of double that number and the cost will be correspondingly low. If the area cut over each year is from now on completely reforested in this manner, there need never be any diminution in the annual output of redwood lumber. In seventy-five years when the last virgin stand is cut, the older second growth areas will be ready for the ax and so the process will repeat itself indefinitely. There is good reason to believe that under the intensive forest management which will be the rule in fifty to seventy-five years th present annual cut of redwood can be *increased about* 50% and maintained at that figure.

If fires had not swept over the cut-over lands at intervals since they were logged, most of them would now be supporting a fairly good second growth forest. Associated with the redwood are usually to be found Douglas fir, tanbark oak, California laurel, madrone, and towards the north, lowland white fir, Sitka spruce, western hemlock, and scattered trees of several other species. All of the hardwoods sprout vigorously and in most cases can be depended upon to produce a very fair secondary stand between the clumps of redwood sprouts if——. It seems that there must always be an "if" and in this case it can be spelled backward, which, with the addition of *re* gives the answer. It is only within the last five years that the state has set seriously to work to combat the forest fire evil and while mature timber has been protected for several years by cooperative effort the cut-over lands were always considered until recently, of too little value for anyone to care whether fire swept them or not. Consequently it did, and each time it killed practically all of the sprouts, weakened or destroyed the vitality of the redwood stumps and favored the spread of the oak root fungus, a serious enemy of the hardwood species. Any seed trees which were left under old logging conditions were soon killed off together with their young progeny and, as the more valuable tree species disappeared, the chaparral or dwarf species, mostly ceanothus, took their places and formed dense, impenetrable thickets in which no tree of value can get a start. Such is the history of most of the redwood cut-over lands; the whole mountain side immediately adjacent to the wonderful flat on Big River was of this depressing character and the only reason for the difference on the flat was that the moisture conditions there made it literally too wet to burn. There are fortunately a few notable exceptions to the rule whereby some fortunate chance or design has been kept out. The Union Lumber Company has for years been able to keep most of its cut-over lands on the Noyo River free from fire and the splendid stands of mixed second growth are a cheerful augury for the future. Smaller areas of similar character may be found along the Russian River, in Marin County and in the Santa Cruz mountains, as a demonstration of what will be possible with increasing vigilance by state and land owners in the prevention of fires.

Photograph by E. Fritz.

REDWOOD AREAS DURING AND JUST AFTER LOGGING LOOK AS IF THEY HAD BEEN DEVASTATED BEYOND REDEMPTION TO ONE WHO IS NOT FAMILIAR WITH THE REMARKABLE CAPACITY OF THESE TREES FOR REPRODUCTION.

There is good reason to believe that the day of uncontrolled fires is about over. The companies are coming to realize the potential value of logged lands for future timber production and are forming cooperative associations to protect them. The first of these associations, organized some years ago in Mendocino County, has this year increased its membership until a very large part of the virgin timber and cut-over lands in the county is being protected by its rangers. The companies in Humboldt County will probably take similar action in the near future as all have agreed to assist the State Board of Forestry in its campaign of fire prevention and suppression. This campaign involves the appointment of a district ranger in each county to compel the clearing up of dangerous areas of slash and to organize crews for rapid and efficient handling of fires. Careless campers, fishermen and automobilists are still the chief cause of anxiety during the dry season, but many of these are being brought to justice with a stiff fine that teaches them more careful ways and furnishes a wholesome example to others that the California fire law has a kick in it which cannot be violated with impunity. Under modern methods of logging and close utilization of refuse material for firewood, there is very little inflammable matter left after logging is completed. These lands are therefore much easier to protect than they

were when logging was not so clean. The value of natural reproduction is becoming increasingly appreciated and the day when it will be supplemented with nursery grown seedlings is not far off. Truly all of these things are working together for the good of the cut-over lands and we may confidently look forward to seeing a large proportion of the 900,000 acres of virgin timber, still to be logged, grow rapidly again into timber under adequate safeguards from the worst despoiler of the forest—fire. The older areas are a more difficult problem, many of which will require long continued, painstaking and expensive effort before they can be adequately restocked with trees. This will come in time but we are for the present mainly interested in seeing successful efforts made to prevent any of the freshly cut area getting into this forlorn condition.

REDWOOD CUT-OVER LAND ON THE NOYO RIVER SEVEN YEARS AFTER LOGGING. THE SPROUTS ARE DEVELOPING SPLENDIDLY BUT THE STAND IS TOO OPEN AND SUBJECT TO THE INVASION OF CHAPARRAL SPECIES. THIS CONDITION HAS INDUCED THE EXTENSIVE EXPERIMENTS IN ARTIFICIAL REPRODUCTION NOW BEING CARRIED ON.

A number of companies, representing over 60% of the annual output of redwood, have retained Major D. T. Mason to study the problem of their individual lands and make recommendations for future forest management. The supposition is that a majority of these will proceed in the immediate future to act on these recommendations. One, the Union Lumber Company, of Fort Bragg, has adopted the principle of permanent timber production and is proceeding on this basis. They have planned what they hope will be nearly "air tight" fire protection on all their lands as the necessary first step and a number of rangers are in the field this summer to carry it out. V. B. Davis (U. of Cal., '21) has been placed in charge of the reforestation program and is developing on the outskirts of Fort Bragg a gem of a forest nursery. Here on an area of about ten acres, within sound of the busy saw mill is growing this summer the first big crop of redwood seedlings ever raised for reforestation purposes. There are fifty seed beds of redwood seedlings and others with experimental lots of Douglas fir and Sitka spruce. He is planning to use about a half a million trees a year which will give you an idea that this spot will be a busy place in the future. The nursery is situated on a fine piece of level sandy loam soil, has a business-like little building for storage of seed and tools and the whole is surrounded by a neat white picket fence. Though but a few months old it looks the essence of stability, and residents of Fort Bragg are already pointing with pride to "our nursery." It is indeed a symbol of progress and permanence. The company is making experiments in the leaving of seed trees along ridge tops as may be noted in the illustration, and in cooperation with the Forestry Division of the University of California is carrying on extensive planting tests of trees not native to the redwood region, which may prove to be well suited to the conditions. A number of the more valuable hardwood species such as red and white oak, black walnut, and sugar maple are being tried in the hope that some of these valuable finishing woods may be produced in the west.

The University of California through the Forestry Division is carrying on a detailed study of redwood yield on different sites. Studies of redwood seed production and germination and other reproduction methods are also in progress. Redwood second growth is in extensive use for piling, poles, and for all kinds of rustic construction. Very little has as yet been sawn into lumber so a study is also being carried on by Professor Fritz to determine its usefulness for that and for other purposes. The United States Forest Service at the request of the California Redwood Association began last year a study of wastes which occur in redwood logging and milling as they are carried on at present in the hope that these can be largely eliminated in the future. In these and other ways the foresters and forest agencies of California are doing everything in their power to discover important facts which may assist operators to a realization of the innate possibilities of these lands.

From what has been said I think it is evident that forestry among the giants has alluring possibilities. The past year has seen the idea of permanent timber production firmly implanted in the minds of at least one group of men who are doing big things in a big way among the redwoods. With such a favorable beginning there can be little doubt that the idea will spread, take root elsewhere in the region and grow vigorously to the

end, that before long the maximum acreage shall have been placed under permanent forest management. And what, after all, could be more natural, when all people are feeling concern over vanishing timber supplies, than for far seeing men to make immediate plans to meet part of that future lumber shortage by taking advantage of conditions in this favored region and growing new giants to take the place of old ones. Here is another chance for the west coast to profit by the example of some older parts of the country and take action while there is yet time, to insure permanent maximum production at least on all redwood lands. The stage is set, the properties are ready and the first act in this forest drama is drawing the interested and sympathetic attention of a large audience. They, the American people, are hoping and expecting that it will prove to be a problem play with a happier ending than the forest tragedies of the past and I, for one have faith enough to believe that, in the land of the giants at least, they are going to see things turn out to their entire satisfaction.

In closing I would like to say just a word about another very important aspect of the redwood region. California has long been known as the play-ground of the nation and among all of its beauty spots and wonders the redwoods probably take first rank. Their size and beauty; the coolness of the summer climate in the region, and above all, its great accessibility, have combined to make the redwood country a mecca for tourists and pleasure seekers. The two best known groves, Muir Woods National Monument, and California State Redwood Park are so close to San Francisco that thousands of hikers and automobilists visit them each week. Through the efforts of the Save the Redwoods League, backed by private gifts and a $300,000 appropriation from the legislature, a considerable acreage of Humboldt's finest redwoods has been added to the public playground area during the past year. These last purchases were made to include a strip of considerable width bordering the new state highway along the south fork of the Eel River; a drive which is already famous for its great beauty. One particularly noble grove has been dedicated to the memory of a gallant American officer who fell in France, and undoubtedly others will be given to the public in a like manner. Many people hope that Congress will provide money for the purchase of a National Redwood Park of several thousand acres but whether this much desired end is accomplished there is no danger that all of the old redwoods will be wiped out by logging.

Important as these old groves are, the second growth areas are destined to be of even greater importance from a recreational point of view. Already hundreds of summer resorts are being developed in cut-over areas and this is just a beginning. Mount Herman, Brookdale and other famous beauty spots in the Santa Cruz mountains; Mill Valley and the other towns clustering at the foot of Mt. Tamalpais; all of the crowded resorts along the Russian River and other places too numerous to mention have as their chief charm the beauty of redwoods among which they are built—and all these are second growth stands, though many people do not realize this fact because of the size and beauty of the trees. More and more people are each year looking to the redwoods to supply that contact with the quiet force of nature so indispensable to a perfect vacation and we may confidently look forward to a wide extension of this important use of the land of the giants. (*Photographs by the author.*)

Proposed Memorial Tablet to Dr. Joseph Trimble Rothrock

The friends of Dr. Rothrock are arranging to place a memorial tablet to his memory in the Department of Forestry of Pennsylvania, in the Capitol Building at Harrisburg, Pennsylvania.

The State Commissioner of Forestry, Major R. Y. Stuart, has appointed the following committee to take this matter in hand: Dr. Henry S. Drinker and Colonel Henry W. Shoemaker, members of the State Forest Commission; Mr. George H. Wirt, Chief Forest Fire Warden; Professor Joseph S. Illick, Chief, Office of Research; and Major Stuart, ex-officio.

It is hoped and expected that sufficiently large contributions to this fund will be received to enable the committee to procure a large bronze tablet containing a medallion portrait of Dr. Rothrock, executed with artistic taste, and including an inscription giving a succinct record of Dr. Rothrock's great and valuable services to the cause of forestry and to humanity.

Friends desiring to contribute will please do so by mailing check or postoffice money order to Dr. Henry S. Drinker, chairman, Merion Station, Montgomery County, Pennsylvania.

It is estimated that the cost of the memorial tablet will be about $1500.

FOREST TAXATION

Report of the Committee on Forest Taxation of the National Tax Association.

For a generation and more there have been complaints from those interested in forestry of the unfortunate effects of the American tax system upon forests and the enterprise of forestry. * * * Suffice it to say that the earlier study of this problem succeeded in establishing certain conclusions which may be summarized briefly as follows:

The Present Problem

(1) That as a rule forests were assessed far below their true value, and that, owing to this circumstance combined with lax administration of the tax laws, forests had not generally been subject to excessive taxation;

(2) That barring certain localities and some individual cases, taxation had not been responsible for destruction of the forests or for failure to reforest cut over lands or to practice forestry. These results have been due to other causes more potent than taxation;

(3) That the property tax is fundamentally defective when applied to the total value of land and trees of a growing forest, resulting, if strictly administered, in grossly excessive taxation of forests as compared with other forms of property yielding annual incomes;

(4) That, if at any time other conditions should become favorable to the practice of forestry as a private business enterprise, continuance of the prevailing property tax upon growing forests would prove an insufferable obstacle;

(5) That the remedy lay in the relief of growing forests from the rigors of the property tax through the more or less complete application of the yield tax;

(6) That the attempt to promote forestry by tax exemptions as embodied in earlier legislation, was quite futile;

(7) That the mature or virgin forest presented a distinct problem, toward the solution of which little had yet been accomplished.

Our first task now is to take stock of what progress has been made during the past decade. We note first of all that the principal conclusions of your previous committee, as just summarized, have stood the test of time and gained very general acceptance by those who have given attention to this subject, a result in which this Association may take justifiable pride.

Progress in Forest Taxation During Past Decade

On the practical side of legislative achievement, the result is less gratifying. A few states have passed laws aimed to relieve the forests from the worst hardships of the general property tax and in these laws there has been a timid application of the yield tax principle. (Note details of state laws since 1913.) But these laws have not gone to the root of the matter and they have failed to produce any important practical results. They have usually been optional and for one reason or another have generally been ignored by forest owners.

In spite of the general acceptance of the principle of the yield tax as a theoretical proposition, there can be no doubt that the plan of the pure yield tax, as recommended in the Report of the National Conservation Commission of 1909, has been generally regarded as too extreme and involving too many practical difficulties from the view point of the public revenue. There has developed an unmistakable public opinion to the effect that all forests must continue subject to the property tax at least upon the land and that the application of the yield tax must be limited to the trees. This position was accepted by your former committee, which in 1913 recommended for "new forests" a combination tax consisting of an annual tax on the land, valued as bare land and taxed at a rate equal to half the prevailing rate of the general property tax, together with a 10 per cent yield tax upon forest products. It is safe to say that the fundamental idea of this plan has gained general acceptance among the advocates of forest tax reform. And yet there has been a disappointing lack of legislation along this line.

Pure Yield Tax Too Extreme

On the other hand, the need of reform has increased alarmingly and is more widely recognized than ever before. The dependence of the nation upon timber and other forest products, the rapid decline of our forest resources, and the impending future famine are subjects which this Committee feels it need not enter into in view of the presentation made by Professor Chapman at the last Conference (1921). These matters are of vital interest to the nation; attention has been given them by such bodies as the United States Forest Service, the Chamber of Commerce of the United States, the American Forestry Association, etc. The present crisis is not due primarily to taxation. But the burden of taxation has grievously increased in the past ten years and the necessity of reform, to clear the way for the practice of private forestry, was never so urgent or so well recognized as today.

Forest Tax Reform Alarmingly Urgent

The Committee has therefore set itself the task of answering these questions: Why has the progress of forest tax legislation been so slow? Is the plan proposed by the Committee of 1913 still worthy of our recommendation? Is the lack of results to be ascribed to weakness in that plan? If so, how may the plan be so modified as to bring, not merely recognition of its theoretical correctness, but adoption by the legislatures of the states? In all of its inquiry the Committee has had in view the same objects as were before the former committee, stated thus in its report:

Why Has Tax Legislation Lagged?

"(1) It is proposed to place upon forest owners their fair burden of taxation as compared with other taxpayers. No subsidy or special favor to forest owners is contemplated. The legitimate objects of correct forest taxation may be obtained by a change in the method of taxation without generally involving any reduction in the taxes paid at present.

"(2) The forest owner should be guaranteed that his burden of taxation will be reasonable and that its amount will bear a fairly definite ratio to the income from his forest and be fairly predictable in advance.

"(3) The various political bodies involved (States, counties, towns, etc.) should be guaranteed against any serious irregularity of income resulting from the changed method of taxing forests.

"(4) The method of taxing forests should be such as will impose no obstacle in the way of the best use of existing forests and the investment of capital in new forests. So far as consistent with the other objects stated, the tax plan should be a direct inducement to these ends."

Two Distinct Problems

It has become evident that the taxation of forests involves two distinct problems, relating respectively to growing forests and to native or virgin forests. (We shall divide our following discussion into two parts accordingly.)

The Taxation of Growing Forests

The idea of the former committee was to find a method of taxation that should take the place of all existing taxation upon forests. This meant practically to find an equitable substitute for the general property tax. It was recognized that theoretically such a substitute might be either (1) an annual tax on the original capital value of the forest, what the foresters call the "expectation value," which practically amounts to the value of the bare land, or (2) a tax on the yield of forest products whenever obtained.

In the first alternative the rate of the tax should be the prevailing rate of the property tax on wealth in general. The yield tax in order to impose a burden equivalent to the tax on other wealth, should be at a rate determined by dividing the prevailing rate of the property tax by the rate of interest. Thus, if the rate of interest were 5%, an annual tax on original capital value at 1% is equivalent to a yield tax of 20%.

Recognizing the practical obstacles to both of these alternatives, the former committee proposed a compromise involving an annual tax on the land at half the rate of the prevailing property tax and a 10 per cent yield tax on forest products. This recognized the principle that a combination of the capital tax and the yield tax should impose the same total burden as would result from either of these taxes alone; hence the rates recommended.

[*Cf. Fairchild, "Suggestions for a Practical Plan of Forest Taxation," Proceedings of the National Tax Association, Vol. VI, 1912.]

In the opinion of your Committee analysis of this plan brings to light two features to which may be ascribed its failure to gain more general acceptance. In the first place, the yield tax under American forest conditions would necessarily be irregular as a revenue producer. In spite of practicable devices for correcting this irregularity which were suggested,* the public and the legislatures have been extremely cautious about accepting any plan which even remotely threatened to introduce an element of uncertainty or irregularity into the local revenue system. This is undoubtedly the chief obstacle to the practical acceptance of the yield tax.

Defects of Former Plan

The other feature which appears as an obstacle to the adoption of the former plan is this. The plan, as proposed, was a compromise between the annual land tax and the yield tax. As such, it gave a reduced land tax, at half the rate paid by other property, to be made up later by the yield tax. This was, at the start, a concession to the forest land owner. It could be granted only where there was reason to expect the future yield tax. It was essential to make careful provision to prevent resort to the law as a means of escaping taxation on agricultural or other non-forest land.

The plan therefore involved complicated provisions seeking to restrict its application to true forest lands, limiting it to lands not exceeding a certain value, requiring that the lands be properly planted or otherwise stocked with suitable species of trees and that the young forests be properly maintained. The special forest tax was optional, to come into force only after application by the owner and inspection and approval by the state forester and to terminate whenever the owner should desire to withdraw or the state forester should decide that the forest was not being properly maintained. All of this meant complicated procedure and red tape and has doubtless gone far to cool the interest of the forest owners in the plan.

Tax Concessions For Growing Timber Not Successful

Of course any arrangement which involves a concession in the way of reduced taxation must be safeguarded in some such way as this. Some of the earlier plans of forest tax reform involved special favors to the forest owner in return for certain specified management of his forest under a contract with the state. Forest owners have been very reluctant to bind themselves by such contracts, and the laws containing this feature have everywhere failed to produce results. But even where there is no intention to give any ultimate favor to the forest owner, the presence of an initial concession requires some safeguard against abuse.

Hence nearly every plan of forest taxation that has appeared in the past ten years has involved restrictions upon its application similar to those contained in the plan of the former committee. This is believed to have been the chief reason for the failure of all these plans to obtain more general acceptance. Your com-

mittee believes it is of the utmost importance to develop a plan which shall be of universal application, which shall be compulsory and not optional, and which shall not be hedged about with the red tape of applications, inspections and official sanctions.

Recent Developments Simplify the Problem of Forest Taxation

This goal which seemed quite unattainable to those of us who were working on the problem ten years ago, has, we believe, been brought within our reach by certain developments of the past decade in the general field of taxation. Two things have happened. One has been the unexpectedly rapid disintegration of the general property tax with the corresponding rise of taxes upon incomes and earnings. The other is the development of new ideas, regarding the whole system of state and local taxation, under the inspiration and guidance of the Model Tax Committee of the National Tax Association.

These developments have greatly simplified the problem of forest taxation. The old general property tax was intolerable in its application to growing forests. The task was to find some substitute, assuming that the general property tax would long continue for other property in general. The one great achievement of our earlier efforts was to develop the idea of the yield tax. Yet, rather curiously, the practical outcome has been, not the adoption of a special yield tax for forests, but the remarkable spread of the income, earnings, or yield basis for taxation in general. While we have been struggling to secure the yield principle as a special concession to the forests, the general tax reform has caught up with us.

The Yield or Income Principle the Right Basis

The problem today is no longer to find a special method for taxing forests in lieu of all other taxation, but to fit the taxation of forests into a general tax system which is itself destined to rest more and more on the yield or income basis. For example, the Model Tax Committee proposes a system of state and local taxation resting on three foundation stones: (1) the individual income tax, (2) The property tax, upon tangible property only, and (3) the business tax. The individual income tax would of course treat forest incomes like any other income. The forest owner can have no grievance here. So far as the peculiarities of his business are concerned this is the most favorable kind of tax for him. There is no special problem for us here. Likewise the business tax, where such a tax is in effect, will rest upon the income or yield basis, the one best suited to the peculiarities of forest enterprise. Some special adaptations to the business of forestry may be desirable, but at any rate the yield principle is secure.

The only problem remaining is to find a modification of the property tax which shall be suited to the peculiarities of forest enterprise. * * * *

Tax the Land Annually and the Timber When Cut or Mature

As has been pointed out, the annual tax on the land at the rate of the ordinary property tax is all the burden that can fairly be placed upon the growing forest. To impose an additional yield tax is excessive. Those who have proposed this have apparently had the feeling that to grant entire exemption of growing timber without any compensation was too great a concession or else have had in mind the mature forests, which as we shall show must be called upon for more than the land tax. As regards growing forests there is no principle either to justify a yield tax or to measure its amount, if the land is already subject to annual taxation like other property. Such an additional yield tax is justified only in consideration of a reduced rate of the land tax, as proposed by the Committee of 1913.

When we were seeking a special forest tax in lieu of all other taxes, it was felt that the annual land tax at the regular rate, paid for many years in advance of an income from the forest, was a serious hardship. Now we are assuming that forests are to be subject to the individual income tax and the business tax, and we are seeking only an adaptation of the property tax. This is not the whole tax on forests but only a part of the system. The simple solution becomes practicable and not unduly burdensome; i. e., the annual tax on the land only at the regular rate of the property tax, with entire exemption of growing trees. No additional yield tax is required so far as the property tax is concerned. With such a tax, there remains no necessity for any optional feature, for applications or inspections, for contracts or official interference with the owner's management of his forest. The law would apply to all lands and would simply have to provide that in assessing real estate no account should be taken of the value of growing trees.

Yield Tax Takes Place of Business Tax

The yield tax would appear, not as an additional tax in lieu of the property tax, but in the place of the business tax. The forestry business is fairly simple. It is doubtful if the complicated system that has been worked out for manufacturing and mercantile business is necessary or desirable for forests. The simple tax on the stumpage value of forest products corresponds fairly well to a tax on net income and would probably be the best means of applying the business tax principle to the forests. The rate of the yield tax should correspond to the rate of the business tax on other enterprises. Five per cent is suggested as a reasonable rate where circumstances do not indicate the proper rate.

We summarize our plan for the taxation of growing forests as follows:

Committee's Plan Summarized

(1) The law shall provide criteria for determining what is "mature timber."

(2) All trees other than mature timber shall be exempt from taxation, and in assessing land no account should be taken of the value of any trees except mature timber. Forest lands shall be assessed no higher than similar bare lands in the neighborhood.

(3) All forest products (with the exception of certain small quantities taken by the owner or the tenant for his own use) shall be subject to a yield tax at a rate corresponding to the business tax on other businesses. The rate would perhaps ordinarily be in the neighborhood of 5 per cent. The yield tax should be administered by state officers, and the proceeds distributed to the town or counties.

(4) It is assumed that if there is an individual income tax, forest incomes will be treated exactly like other incomes.

(5) Certain administrative problems will arise, particularly in connection with the yield tax. Since this matter has been fully treated in previous reports and addresses, already referred to, the Committee regards further discussion unnecessary. No serious obstacle is to be anticipated.

At two points this plan may require further defense. (1) The old general property tax was defective because

Plan Assures Owners Reasonable and Definite Taxation

(a) by taxing the total value of land and trees it imposed an excessive burden upon the growing forest and (b) it placed on the owner the inconvenient obligation to pay annual taxes for years before any income was realized. The first of these defects is avoided by exempting the trees. The second remains, though greatly reduced. Under all the circumstances it is felt that this inconvenience must be accepted by the forest owner. In return he is guaranteed a reasonable tax burden made up of a small and fairly certain annual tax on his land and a yield tax at a definite rate.

(2) The chief objection to the yield tax, as already stated, is the irregularity of the resulting revenue.

Irregularity of Public Revenue Less Marked

This difficulty is present in the Committee's plan. It should be noted, however, that the irregularity resulting from a moderate yield tax (in the neighborhood of 5 per cent) combined with a steady annual tax on the land is quite different from the result of an exclusive yield tax (at the rate of 20 per cent or thereabouts). If nevertheless this difficulty appears serious, there are ways by which it may be avoided. Six possible methods were suggested by the Chairman in his address before the Sixth Conference in 1912. It is not necessary to rehearse them here. One of these suggested methods, involving advance annual payments by the owner to be later deducted with interest from the yield tax, has recently been taken up and skillfully developed by Mr. Murphy of the Forest Service. The Committee believes that in most states the irregularity resulting from the yield tax as recommended will not be serious, whereas for any state which finds this a serious matter there are adequate remedies.

Our discussion thus far has related to the growing forest only, with the purpose of devising a method of

The Taxation of Mature Timber

taxation which shall be equitable to all parties concerned and shall not be an obstacle to the reforestation of cut-over lands or the development of new forests. The mature forest presents quite another problem. We are here dealing with a full-grown product. Two cases appear, depending primarily on whether the timber is actually marketable or not. By marketable timber we mean mature timber which is accessible and so located with respect to market and transportation facilities that its immediate marketing is possible. Whether it actually is being marketed depends upon the owner's judgment as to the most favorable time. There is nothing in the theory of the property tax to affect adversely marketable mature timber. A property tax fairly drawn and administered with even-handed justice upon all owners of taxable property would give the owner of such mature timber no ground for complaint. Of course, the obvious rejoinder is that this ideally perfect property tax exists only in the imagination. The real property tax, as we know it, is badly drawn and more badly administered. Its application is unequal and unjust. If forests of marketable mature timber are taxed more heavily in proportion to their true value than other classes of wealth, the forest owners have a grievance, but it is in no way different from the grievance of any other property owner under similar treatment.

On the other hand, when timber is so located that its present marketing is not possible, the situation is in

Tax Burdens on Virgin Stumpage Growing Heavier

theory similar to that of the growing forest. We have here a form of capital whose income is deferred to the more or less distant future. It is true that the timber is mature. But if other causes beyond the owner's control defer its marketing, the result is the same. It is the fact of the necessarily deferred income, rather than the particular cause of that fact, which makes the annual tax on capital value work injustice. * * *

Careful investigation made ten to fifteen years ago, to which reference has been made, showed that on the whole forests had not, up to that time, been taxed excessively. Probably they had on the whole been assessed more leniently than other classes of wealth. But it was pointed out at that time that the epoch of lenient taxation was drawing to a close and that heavier and even excessive taxation might be expected in the near future. The past decade has fully justified this prophecy. Tax burdens in general have become enormously heavier, and there is plenty of evidence to show that, in the great

virgin timber states, at least, the burden has been increasing more rapidly on timber than on other wealth. The owners of large tracts of mature or virgin timber have reason to be alarmed.

Where Public Interest Enters

What makes the matter of public interest is this: The mature forests represent a national resource of vital importance to the wellbeing of the people. This store of wealth has been gradually built up by nature during many past years. Its utilization has for some time been proceeding more rapidly than its restoration by natural growth and plantation. The store is diminishing and virtual exhaustion may be foreseen in the not distant future. It must be repeated that taxation is not the cause of this condition and that no change in tax methods will materially alter the situation. This is not primarily a tax problem. Taxation becomes a consideration in one way only. If through the faulty tdministration of the property tax mature timber is subjected to an excessive burden of taxes, the owner, already burdened with heavy carrying charges, may find himself forced to market timber before the economical time, suffering less himself and hastening unduly the depletion of the nation's forest resources.

Of course, by this same token, the forest owner would benefit and the exhaustion of the forests be perhaps retarded by special favors in the way of reduced taxes or entire tax exemption. But this is a program which your committee has refused to consider, standing firmly on its purpose to find a tax system which shall place on forest owners their fair burden of taxation, no more, but also no less, as compared with other tax payers. It is not believed that the public interest as a whole has anything to gain through the granting of special tax favors to this class of tax payers.

Forest Owner Entitled To Fair Treatment

On the other hand, the forest owner is entitled to fair treatment. He has the right to ask two things: (1) that his total tax burden shall not be excessive as compared with other tax payers and (2) that the amounts exacted from him shall not be arbitrary and uncertain. The latter consideration is possibly even more important than the former. It is especially vital to the forest owner, whose income may be long deferred while interest and other expenses run steadily on. There is danger that the just taxation to which the forest owner is entitled may be denied him, either through the inherent defects of the property tax as applied to forests whose cutting is necessarily deferred, or through the assessment of marketable timber at values relatively higher than are placed upon other taxable wealth.

The problem of taxing mature timber has not received the study which has been devoted to the taxation of growing forests, and the solution is not so obvious. The former committee (in 1913) made certain tentative recommendations, while admitting frankly that it was not prepared to say that its plan would fit the conditions in those states of the Pacific Coast, the south, and the extreme northeast where the most extensive areas of virgin forest are found and where the problem is most serious. The sub-committee of the National Conservation Congress also made suggestions, likewise somewhat tentative.

Tax Forests on Even Terms With Other Wealth

In seeking a solution, your committee starts with these principles: (1) that mature timber should be taxed so far as possible, on a par with other wealth and business; (2) if there is an individual income tax, it should relate to forest income the same as any other income; (3) where there is a special business tax, it should take the form of a yield tax for forest enterprise. These principles are the same as have been recommended for growing forests and their discussion in that section applies generally here; (4) the property tax as applied to marketable mature forests should be the equivalent of an annual tax upon the land and trees, assessed in the same ratio to true value as prevails for other taxable property in general, and at the same rates as are applied to other wealth; (5) the property tax when applied to forests of mature timber which will not be marketable till some time in the future should take account of the fact of deferred income.

It is the practical application of the last two principles which presents the difficult problem. As has been pointed out, the owner of marketable mature timber has no reason to complain if the property tax is applied to his forest on even terms with other kinds of property. But this is not enough for the owner of unmarketable mature timber. Yet the legal separation for taxation of these two classes of mature timber is probably impracticable. There would be too much of personal judgment involved, and disputes and unequal treatment would almost certainly follow. What we must seek is an equitable method of applying the property tax or its equivalent to all mature forests.

Why the Pure Yield Tax Won't Work

From the point of view of the forest owner, the most favorable solution would probably be the pure yield tax. But the pure yield tax will not do, for two reasons at least: (1) the owner of marketable mature timber, who chooses to hold it uncut for sale in the distant future or as a pleasure park or hunting ground, must not be permitted thus to postpone his tax contribution indefinitely or avoid it altogether; (2) the resulting irregularity of public revenue would be a serious matter, especially in those localities where virgin timber composed a large part of the taxable wealth, these being the very communities where the problem of the taxation of mature timber is most acute. As has been observed heretofore in this report, there are ways of adjusting this irregularity of revenue, but nevertheless the public appears unwilling to take the chance. There are other serious difficulties, both theoretical and practical. We are quite safe in concluding that the pure yield tax is not the solution.

The combination of an annual land tax and a yield tax meets about the same objection. The principal value of a mature forest is in the timber rather than the land. Introduction of the annual land tax, therefore, fails to meet the objections to the pure yield tax. At best it mitigates them slightly.

Taking everything into consideration, your Committee is of the opinion that the only practicable solution of this problem is to seek to make the property tax as equitable and convenient as may be. In particular every effort should be made to insure a fair assessment of forest property. This means not only an accurate valuation. It requires also that the assessed value of forest property shall not bear a higher ratio to its true value than the prevailing ratio of assessed valuations to the true value of all taxable property. Assessment at the hands of a State officer or board would doubtless assure uniformity and certainty in the assessments. There is always the danger, however, that such efficient assessment by arriving at the true value of forest property will unjustly burden such property as compared with other property not so efficiently assessed. Equality in taxation must be real equality, not merely formal.

Property Tax Offers Best Solution for Mature Forests

It is admitted that this solution is more favorable to the forest of marketable timber than to that which is for the present not marketable. But the committee has thus far been unable to discover a practicable means of reconciling this discrepancy. As a matter of fact the inequality would probably exist more in theory than in practice. It is hardly to be supposed that the assessors would take pains to raise the assessment of unmarketable timber each year to take account of the approach of the date of cutting, the possibility of this being what makes the property tax unjust to such forests. If the assessors seek honestly to value all mature forests on the same basis as other taxable wealth it is probable that little injustice will be done. If such treatment could be guaranteed, the owners of mature timber would probably have little reason to complain.

BUSINESS SEES TIMBER SHORTAGE

"TEN years ago, I took no stock in this talk of a timber shortage," said W. DuB. Brookings, Manager of the National Resources Production Department of the United States Chamber of Commerce, in addressing a meeting of the National Wholesale Lumber Dealers Association in Washington. "Today I can see the clouds gathering on the horizon. We are using timber much faster than it grows. Substitutes may lower the per capita consumption, but the total consumption for the nation will not decrease. And what is important to note is that low per capita consumption results from high prices and inability to get lumber, and not as is generally believed, from preference for substitutes. Norway and Sweden, lumber countries, use as much lumber per capita as the United States. Italy and Spain would use as much also if they could get it at a reasonable price.

"The United States has had the cheapest lumber in the world and the free use of our forests has been a factor in our unparalleled economic growth—but was it wise to have permitted the great supplies near our eastern and middle western industrial centers to become exhausted? Picture those magnificent 12-foot fir trees of Oregon and Washington being cut into one-by-four and two-by-four and brought through the canal for use on the Atlantic Coast, while almost at our doors, are the Southern States, the greatest hothouse for growing timber in the world, with millions of acres suitable only for growing timber, lying idle.

"Have these changes been of benefit to the lumber manufacturers and distributors, taking an average over a period of years and considering these industries as permanent factors in American business life? It has kept the manufacturers on the move, and brought many problems to the wholesaler. The longer the freight haul the higher the cost of freight; the higher the price the greater the investment in doing business; the higher the price to the consumer the quicker he turns to substitutes. The increase in freight charges on lumber over former years for the city of Chicago alone is said to be $22,000,000, a basis for judging the total burden on the country as a whole for not having timber supplies growing nearer the great industrial centers.

"Lumbermen may differ as to how to insure a steady and ample supply of timber but they agree that the millions of acres of former timber lands unsuitable for agriculture, now lying idle in every state that has ever produced timber in large amounts, should in some way be put to work."

Photograph by U. S. Forest Service.

THE ECONOMY OF WOOD PRESERVATION

The broken post above was weakened by decay to the point of failure after one year's service in the mine. It was sound when installed, but was not treated with a preservative. The post next to it, which was treated with a preservative and placed at the same time, remains sound and uninfected by decay. Two other untreated timbers in the foreground show fungus attack.

TREE FELLING AS A SPORT

By W. Gilman Thompson, M. D.

A FORM of labor which from the stone age to the present time has attracted many of the world's great men surely possesses something more than mere drudgery, such as the compelling of interest, of observation and skill. All this and more is to be found in tree felling, which, regarded as a sport, has much analogy with golf. The swing of the ax and the swing of the club call into play similar muscles; one must plan carefully the direction of the stroke and keep the eye unvaryingly upon the objective point of the blow, or it is easy to "slice" in the one case the ball, in the other the toes! A firm stand upon good footing, a straight knee and a full swing are equally essential. The direction of the drive must be carefully planned, for the tree, like the ball, which does not lie where it should best be placed, may involve much vain effort in extricating it.

"If the tree falleth toward the south or toward the north, in the place where the tree falleth there shall it be." (Ecclesiastes II.3.)

But as there are analogies there are differences and the chief divergence between these sports lies in the important fact that in the case of the tree, once having hit the blooming thing it is still there and one does not have to hunt over a ten-acre lot to find it.

Probably no single stroke of the ax ever resulted in such lasting fame, as in the storied case of George Washington and his cherry tree. Certainly no such controversy has arisen over the efforts of other "regular fellers." Did the youthful George merely wish to try a new ax, or did he wish easier access to the cherries? Was it the ethical question involved when he exclaimed, "I cannot tell a lie, father," meaning that he had already gone the limit in this direction? And where was he going so suddenly when he "took a hack at the tree?"

These and similar controversial matters have puzzled youthful Americans for so many generations that it would seem futile to attempt to solve them now. Let us rather look upon the bright side of the picture, that of a boy acquiring at an early age a taste for an exercise which is healthful, entertaining and productive, which begets skill, determination and vigor and which, from its effect upon the development of his character, doubtless contributed in no small measure to the greatness of the man. The fact that after all it was a phantom cherry

ABRAHAM LINCOLN SPLITTING FENCE RAILS

tree, rooted only in the mind of the historian, should not be permitted to detract from the usefulness of so valuable a legend for mankind.

As a sport, tree felling presents every gradation, for the beginner may choose a sapling and work up to trees of the largest growth, and he may, as he acquires the true art of the game, select trees of increasing hardness, until the experienced chopper can almost tell with his eyes closed upon what manner of wood his ax strikes. Into the basswood, for instance, the blade sinks as readily almost as a knife into a hardened cheese, and the broad-leaved poplar is almost as soft. But let the novice beware of the ironwood and yellow birch, and stand well from under, for a glancing blow may easily recoil upon the chopper. There is interest, too, in making progress with the size of the chips and keeping the advancing cut smooth and even. What a pleasure it is to watch the experienced woodsmen attack a large chestnut with unerring precision, sending chips six or eight inches long flying many feet off from the stem. Not a stroke of the ringing blows is wasted and the incision is kept as clean as if made by a saw, until the giant begins to quiver, then to sway, and with gathering momentum finally goes down between its fellows, cracking and crashing until it strikes the earth with a mighty thud, the butt bounding up again in final protest at its fate. To do this gives one an exciting sense of power and achievement well worth the energy which it costs.

PRESIDENT HARDING CAN WIELD AN AX

Most of the professional or commercial tree felling is done in winter when the felling of the tree is not hampered by leaves; the wood is dry and hard, being free from sap, and the covering of snow makes it easier to haul out the timber. But for the amateur sportsman vacation time is usually in midsummer when the flow of sap makes conditions quite different and more skill is required to prevent the leafy branches from becoming entangled and preventing a clear fall. In thickly studded growths a dislodged but still standing tall tree may have to be recut part way along the butt, a process often difficult and hazardous. The wood is more fragrant in the summer and no small part of the pleasure of the sport is in developing the resinous, aromatic odors of such trees as freshly cut pine or cedar or the fragrance of the chips from birch and other trees. The color, too, of the fresh chips presents great variety, from the almost pure white of the basswood and faint yellow white of the canoe birch through the brown shades of chestnut and oak to the red of the cedar and fascinating shades of green and orange in a giant sumac.

The tree sportsman learns to be as critical of his axes as the golfer of his clubs, for a poor selection of implements readily spoils the game and dullness or breaking may be a source of real danger. The weight and balance of the haft, and the length, curve and tension of the handle must all be carefully considered to yield the best results.

Where may the amateur obtain the trees for his sport? In a true arcadia of course everyone should have his own "back wood lot" where he can enjoy the pride of cutting his own trees and doing as he will with them. But any farmer will readily grant the privilege to an enthusiast of cutting in his woods under direction. He is always glad of more firewood and every wood lot can be benefitted by "improvement cuttings," to use the forester's term. There are always dead trees to be removed, and always crooked or deformed trees, or trees which are crowding others and interfering with their growth, and it decidedly enhances the value of the property to have them cut down. It would be an interesting experiment to have the members of a golf club adjourn *en toutes* some fine Sunday morning into a nearby wood lot and measure the equivalent of the strokes for 36 holes as applied to producing cordwood! The caddies could be released for Sunday School and the woods would re-echo with "fore" as a warning to get out from under when the trees fell! Although somewhat different vocabulary otherwise would be required, prowess might still be the subject of boasting and the results in exercise would be quite similar in forest and in fair green. Thirty-six well directed

strokes of the ax may fell a fair-sized tree, so even Bogie might have several trees to his score!

One of the earliest references in literature to the ethical lessons to be derived from skillful tree felling occurs in the recital of one of Nebuchadnezzar's dreams. "In the visions of mine head upon my bed," quoth he, it was commanded "to hew down the tree and cut off his branches, shake off his leaves, and scatter his fruit; let the beasts get away from under it and the fowls from his branches. Nevertheless leave the stump of his roots in the earth, even with a band of iron and brass." Which Daniel interpreted, as whereas it was "commanded to leave the stump of the tree roots, thy Kingdom shall be sure unto thee, after that thou shalt have known that the heavens do rule." (Daniel IV. 10-26.)

This may be sound theological doctrine but it exhibits a meagre knowledge of forestry. Job fell into a similar error when he said: "For there is hope of a tree if it be cut down that it will sprout again and that the tender branch thereof will not cease." (Job XIV. 7.) In the limited flora of Palestine this may apply to the olive and the fig tree, although it certainly does not to the cedar. In our forests are many hardwood trees like the basswood and oak, which it is true, send up vigorous sprouts when the parent stem has been cut away, but they usually do not thrive long and practically never reproduce trees of any symmetry or value. The sprouts are vigorous because they already possess an extensive root system, but the processes of decay soon enter the unprotected surface of the stump (not bound with "bands of iron and brass,") travel down into the earth and work up into the stems of the ground shoots or "sprouts." Apparent exceptions are found in the willow and chestnut, but the willow is so hardy that it appears to thrive on abuse, and sprouts may reach a height of 30 or 40 feet, springing from old trunks which are so split and decayed that wide holes let the daylight pass through them. But the sprouts are never so strong as the parent tree. The chestnut is perhaps the most vigorous sprouter of all, particularly in its dying effort to resist the fungus which so lately has proved its mortal enemy. New England forests, until recently, were full of tall chestnut

Photograph by Brown Bros.

GLADSTONE, ENDGLAND'S GREAT STATESMAN, WITH HIS FAMILY AT HAWARDEN, ENGLAND, ENGAGED IN HIS FAVORITE EXERCISE.

sprouts, in groups of three or four or more, springing from the roots of an old stump, cut perhaps in making a clearing, forty years before. They look like excellent telephone poles, but when cut it is found that their stems often are hollow with decay to a height of eight or ten feet above the ground. All this has a lesson for those who for sentimental reasons would preserve the stump of a favorite tree in the front yard or upon the lawn, camouflaging the sordidness of its decay with woodbine or trumpet creeper. Such a stump will never thrive again and with due respect to Job, "the tender branch thereof" will "cease." More than that, it harbors many varieties of fungi and pestiferous insects which latter are a menace to other vegetation, although the species of fungi of dead trees do not attack the living. It follows that in scientific tree felling it is not necessary to consider the stump provided it is cut near enough to the ground to prevent waste of wood.

Horace Greeley must have acquired his fondness for wielding the ax in the five years which he spent as a youth working upon his father's farm at Westhaven, Vermont, and that he continued it in advanced life as a

HORACE GREELEY AS A TREE CHOPPER

COLONEL ROOSEVELT MAKING THE CHIPS FLY

means of exercise and recreation is attested by the picture which represents him in shirt sleeves with a large ax over his shoulder ready to cope with any giant of the forest. His biographer states that much of his early reading was done by the light of pine knots after the day's farm work was done, and he doubtless contributed to their cutting.

It is only fair to state that tree felling, like the sport of boxing, may at times be used as an appeal to the baser passions of mankind. Thus the former Kaiser is reported to have turned to it as a vent for his emotions at a time of life when checkers or backgammon might seem more alluring. There is, however, no fixed age

limit to the sport of tree cutting, covering as it does, the seven ages of man, from the youth of Washington to the old age of Gladstone. One may picture the whilom Kaiser going forth with eager strides, battle-ax in hand, to slay the oncoming cohorts of the Allies as represented to his distorted mind by the serried ranks of the Dutch beeches, he being arrayed erewhile in the majesty of Dutch breeches, and as he "strafs" and "strafs" one may almost hear him mutter between clenched teeth, "take that and that and THAT," very much as one might chastise a most obstreperous boy in the woodshed!

But it is a poor tree that does not grow both ways and in Jonathan's parable, (Judges IX, 8), we read: "The trees went forth on a time to annoint a King over them." One after another, however, all declined as being otherwise more usefully employed in growing roots and branches and so they finally were reduced to electing a bramble!

A fondness for the sport of tree felling leads one naturally to an interest in forestry and to observation of the habits, forms and varieties of individual trees, their rate of growth, their relations to each other in their struggle upward to the light and air in densely covered areas, and further to their economic value and the specialization in the uses of the different kinds of wood.

Each species of tree in addition to general uses such as those of firewood, boarding, etc., has one or several special uses for which it is peculiarly fitted. These oftentimes are suggested on cutting down the tree through noting its relative hardness, its graining, mode and degree of splitting, etc. Thus the chestnut is selected for the framework of pianos and coffins to be veneered afterward with other woods which take a better polish. The willow is used in manufacturing black powder and artificial legs, the poplar for fruit boxes, spools, etc. Moreover, each tree is its own biographer, and the cross section of even a long-time cut and decaying stump presents an open page to one who has learned to read it. From the bark and grain of the wood is to be told the species and from the number of concentric rings the age, for the growing tree must form a new ring each year. More than this, the thickness of the rings varies with the seasonal conditions of light, air currents and moisture, so that under exceptionally favorable conditions the rings may be two or three times the average width. In illustration of this is the following incident: One day while crossing a recent clearing in a New England forest I noticed an exceptionally large stump cut quite close to the ground. Its bark and graining, porosity, etc., showed it to be the remains of a giant tulip tree with 119 rings, indicating an unusual age for a forest tree of that species in that locality. But counting back thirty rings from the margin was one which was more than double the width of the others. This meant that in some manner in that year the tree had had access to more than its usual share of light, air currents and moisture, and it was easy to guess that 30 years before the lot had previously been cut over. Coming down the mountainside I met the son of the old man that originally owned the forest. "Jim," said I, "when was that lot cleared?" "Oh, a couple of years ago." "Anyone could see that," I said, "but when before then?" for, like almost all New England forests, it had been cut over several times. At first he could not recall, but suddenly he said "it was the year my father bought the farm and the first thing he did was to clear that lot." "But when was that?" "Thirty years ago." And thus came the proof that the old giant had written its biography correctly.

Photograph by Underwood & Underwood
HENRY FORD CHOPPING FIREWOOD

ANNOUNCEMENT

The American Forestry Association has moved from 1214 Sixteenth Street to 914 Fourteenth Street, Washington, D. C., from which office all business will be transacted.

Members of the Association are invited to visit the new headquarters of their Association.

LARCH IN MAINE THREATENED BY INSECT DEPREDATION

By H. B. Peirson

CONSIDERABLE attention has been called to the browning of the larch or tamarack in eastern Maine. In many localities large stands of larch appeared as if a fire had swept through, whereas a few weeks previous they had been green. In places where the larch occurs in large stands, making up a high percentage of the forest, whole hill-sides and valleys looked brown.

The first thought was that the larch sawfly was again sweeping over the state. This insect destroyed practically all of the larch in the state in 1882 and has nearly made the larch tree extinct in some of the Eastern states. Within the last few years, however, large quantities of larch have again begun to seed in on old pastures. The larch is an extremely valuable tree, the wood being very durable, so that it is used for the upper knees of small vessels, telegraph poles, fence posts, and railroad ties, besides being used in cabinet work and for interior finishing.

Examination of the stands of larch have shown that the trees are being attacked by a comparatively new insect to this region. It is known as the "Larch Case Bearer" and is very common throughout Europe where it is a serious pest. It was first recorded in this country in 1886 where it had probably been brought on European Larch, a tree that is quite widely planted in the Northeastern United States. At this time it caused considerable injury to a thirty-year-old stand of larch in Northampton, Massachusetts. It has been known for a good many years at the Arnold Arboretum in Boston, and has also been observed in Albany, New York. At no time, however, was it found in sufficient numbers to cause any grave apprehension, as it apparently did not multiply rapidly. At the present time very little is known as to the life history of the insect and observations are now being carried on by the Maine Forestry Department in an effort to determine whether the insect is likely to prove serious or not.

There is apparently but one generation of the insect a year. The delicate gray moths started to emerge from the small cigar-shaped cocoons about June twentieth. The moths, which are only about three-sixteenths of an inch in length, lay their eggs on the new needles and the young larvae hatching out immediately begin to tunnel or mine within the needle, causing it to turn yellow and then brown, starting from the tips. When very numerous, practically all of the needles on a tree may be injured and in many cases destroyed, as in the present outbreak. As soon as the mine is long enough to form a case, a portion of the needle is cut off and the larvae proceeds with this protection to another leaf. When attacking a needle the larvae first cuts a circular hole through which its head and later its body may extend for feeding purposes. The case, which at first is whitish, gradually becomes gray with age, and is lined by the larvae with silk upon the approach of cold weather, when the larva, carrying its case, retires to a sheltered place on the branches or beneath bark and lichens. It becomes active early in the spring and continues feeding. Owing to the fact that nearly all of the feeding is done within the leaf, it will probably prove a difficult insect to check. There is at present every indication that considerable damage may be done to the larch, for the insect is becoming extremely numerous.

Our native larch, known scientifically as *Larix laricina*, is called by a large number of common or local names. In Maine it is commonly referred to as Hackmatack or frequently as Juniper, but this name is very misleading as two real species of Juniper occur in this state. West of Vermont it is most frequently called Tamarack, so that both this name and larch are recognized as the proper names for the species.

Big Buffalo Bull Goes to Uruguay

BISO is unhappy!

He is to be deported, thrust from the land of his birth, torn from his wives and children and doomed to live in exile for the rest of his days.

Secretary of Agriculture Wallace has decreed that he must go; the Forest Service has arranged his transports and Biso is inconsolable.

Biso is the buffalo bull that for fifteen years has been the admiration of visitors to the Wichita National Forest and Game Refuge in Oklahoma. The city of Montevideo, Uruguay, has asked that its zoological garden be supplied with an American bison and the Forest Service men who have charge of the buffalo on the Wichita say that Biso will be an excellent representative of this typical North American species whose once mighty herds roamed the great plains from Mexico to northern Canada.

In 1907 fifteen bison were "planted" in the Wichita National Forest and have since increased to over 150 head. This herd promises to maintain the type and stamina of the original bison, since the animals are kept at all times under natural conditions. They subsist entirely on wild grasses and live within so large an inclosure that they are under practically no restraint. So Biso has been well content and is reluctant to leave. Yet many of the younger buffalo bulls are casting envious glances at the old fellow. It would be very pleasant, they think, to doze idly beneath a palm tree and be served with fresh cut grasses or have their wrinkled noses patted by some dark haired senorita.

But Biso has his doubts.

EDITORIAL

A NOTABLE REPORT ON FOREST TAXATION

FOREST taxation is rated by many second to forest fire as a deterring hazard to the enterprise of growing timber. The present state of our tax laws relating to forests is indeed a sad commentary upon American progress during the past two and a half decades. Failure of our state legislatures to recognize that tax laws, as now generally drawn, tend to tax our remaining forests out of existence and to prevent private individuals from growing new forests, stands today as one of the foremost obstacles to the private practice of forestry in this country.

Because the subject is of such vital importance, *American Forestry* prints in this issue the report of the Committee on Forest Taxation of the National Tax Association, which was read by Fred R. Fairchild, Professor of Political Economy, Yale University, at the annual meeting of the Association in Minneapolis on September 19. The report was prepared by Professor Fairchild, Chairman of the Committee, after consultation with other members of the Committee. It unquestionably is one of the most important contributions to the cause of forest taxation in this country yet to appear and will be read with great interest and profit by all interested in the subjects of forestry, lumbering and taxation.

In the opening pages, the report reviews briefly some of the earlier efforts at forest tax reform and points out the reasons why so little progress has resulted from the movements. Out of the experience of the past and the progress of taxation in general, the Committee views forest taxation today as involving two distinct problems, one relating to young, growing forests and the other to virgin or mature forests. Under the plan proposed for growing forests, by which is meant immature trees, all forest growth, excepting that which had reached maturity under the criteria of the law, would be exempt from taxation.

The land on which the young forest is growing, however, would be assessed—no account being taken of any forest growth other than mature timber—and taxed annually on a parity with similar bare lands in the neighborhood. The tax upon the growing timber would come whenever any forest products are harvested, or in the event there is no cutting, when the timber reaches a growth which places it in the class of mature timber. All timber cut before maturity, excepting small amounts taken by the owner or tenant for his own use, would be subject to a yield tax at a rate corresponding to the business tax on other businesses. The Committee suggests a rate in the neighborhood of five per cent, the tax to be administered by state officials and distributed to the towns or counties.

But should there be no cutting prior to the time when the young forests reach the mature class, it becomes automatically taxable property under the law proposed for mature timber. For mature timber, the Committee recommends the general property tax, based on principles that

(1) Mature timber should be taxed as nearly as possible on equal terms with other wealth and business,

(2) The individual income tax, where it exists, should apply to forest income the same as other incomes,

(3) Where there is a special business tax it should take the form of a yield tax in the case of forests,

(4) The property tax as applied to marketable mature forests should be the equivalent of an annual tax upon the land and trees, assessed in the same ratio to true value as prevails for other taxable property and at the same rates, and

(5) Where the mature forest is inaccessible and therefore not marketable until some time in the future, the property tax should take that fact into account.

"Taking everything into consideration," the report concludes, "your Committee is of the opinion that the only practicable solution of this problem is to seek to make the property tax as equitable and convenient as may be. In particular, every effort should be made to insure a fair assessment of forest property." That the Committee did not think it feasible to distinguish between marketable and unmarketable mature timber, we believe, was a wise conclusion. To attempt such a distinction would at once establish a danger line of controversy and abuse. The property tax applied to unmarketable tracts, if fairly done, will naturally meet the idea of deferred income by a lower stumpage valuation.

The Committee's plan does not fully meet all the difficult and entangling features of the forest tax situation. Such a plan would be too refined to work under present conditions of American taxation. In the recognition of that fact, the Committee rendered its greatest service. It has brought forth a plan which is sane, practicable and simple, and which at the same time strikes the great need in forest taxation, namely, assuring the owner of young growing forests a fair, definite and reasonable method of taxation.

Possibly the main criticism of the plan will be on the grounds that, involving as it does the income tax feature, it will not be applicable in a great majority of the states without first obtaining the necessary constitutional amendments. But as forest depletion advances and the public becomes more enlightened on and more insistent for forest legislation, that obstacle will constantly become of less and less moment. And with the way cleared, the Committee's plan fits in easily with the going scheme of taxation, is uniformly compulsory and is free of red tape and intricate features.

THE RAILROADS AND THE NATIONAL FORESTS

DURING 1921 over five million people visited the National Forests. Year by year the number has been increasing. There is a reason. The National Forests of the west embrace a large proportion of the best remaining game and fishing grounds of the nation. Within their boundaries are some of the highest peaks, a majority of the glaciers and some of the highest waterfalls of the country. By the construction of roads and trails, the establishment of delightful camp sites on wooded mountain streams and the opening up of summer home areas, the United States Forest Service is making these attractions readily accessible.

The National Forests are the greatest pleasure grounds of the American people and to them the American people are coming more and more to seek that invigorating recreation which is now considered a necessity of modern life. And the public is not alone in coming to regard these National Forests as a great recreational asset to be seen, used and enjoyed. The great railroad systems of the country are slowly awakening to the fact that these great areas of wonderful forests and majestic mountains are growing feeders to their permanent prosperity.

Covering most of the important mountain ranges of the west, these Forests with their 156 million acres, contain scenic resources alone which make them an immense asset to the great transcontinental railroad systems of the United States. The newer National Forests of the northeast and the southern Appalachian range will in time become as great an asset to the railroads of the Atlantic seaboard.

Within the nineteen National Parks are the superlatively grand and stupendous effects of Nature, and while they will always remain objectives for the traveler and the tourist, the National Forests—in no sense the rivals of the Parks—because of their greater number, wider extent, and accessibility, will always attract a much larger number of visitors. From a recreation standpoint the National Forests should supplement the National Parks, each attracting visitors to the other, each helping the American to a fuller appreciation of what life in the outdoors can mean and what America has to offer in scenic beauty and grandeur.

Most of the transcontinental lines cross or touch many of the National Forests. Some day the railroad literature, voluminous and for the most part well planned and most attractive, will play up the beauty spots, the free camp grounds, the summer home sites, the mountain peaks and other summer delights of the National Forests, for the good reason that it will be good business to do this. Good roads, automobiles and an increasing number of camp grounds, both municipal and forest, make this necessary on the part of the railroads.

Already several of the Pacific Coast lines are beginning to do this. One road has issued a special hunting, camping and fishing guide for a group of National Forests in Oregon. An edition of ten thousand copies was published in the spring of 1922; this was soon exhausted, and a second edition of ten thousands copies was issued within three months, which shows that the public wants to know more about recreational delights of the National Forests, from first hand contact. General passenger agents and publicity experts of the railroads would do well to consider the National Forests and what they offer.

THE DAWN OF THE APPALACHIANS

A MOTOR road was recently completed to the top of Mount Mitchell, the highest point in eastern America. This road opened up to tourists an alpine climate, a vegetation strongly suggestive of Canada, a magnificent distant view over chain after chain of hazy mountains—and alas, as desolate a waste of destroyed forest as can be found anywhere in the East. Slopes, on which there remain only the gray wrecks of dense spruce and fir forest, disfigure the nearer view from the peak, a veritable blot on the escutcheon. Tentative results of studies now being conducted by the Appalachian Forest Experiment Station indicate that the only effective way to restore these forests is by planting—a slow and time-consuming process.

Unless conservative methods are soon introduced, what is true of Mount Mitchell will be true of mile after mile of spruce covered ridges at high altitudes throughout the Southern Appalachians; and these, as the sources of its waterpower and the crown of its mountain beauty, are figuratively as well as literally, among the highest assets of the South.

In many respects—potential waterpower, scenery, recreational facilities, timber producing capacity, and incidental values—the Southern Appalachians may without too much exaggeration, be compared with Switzerland or Italy. The mountain resources stand in much the same relation to the industrial prosperity, but in the Appalachians the development of these resources still lies largely in the future. As in the older countries, forestry will be an underlying essential of all these lines of development. To reclothe cut-over, burned, and unsightly slopes with a cover of thrifty timber is a prerequisite not only of continuous timber production but also of scenic improvement, waterpower conservation, and in fact all the uses to which forest lands are put.

One of the greatest industries of the Southern Appalachians—a steadily growing one—is the tourist industry. As rapidly as the by-ways and secluded places of the mountains are made accessible to tourist traffic, examples of the need of forestry are increasing both in number and variety. Another first line industry is lumber production. A third great group is comprised of the industries which will develop around waterpower. A three-fold requirement is hereby placed upon forestry. The duty and the opportunity of meeting this demand rest with the public. The federal government, through

the Forest Service, and the States, through their forestry departments, are trying as best they can to meet the situation, but the available resources are only a drop in the bucket compared with what they must be to preserve the forests, with their three-fold values, and to start the bare and denuded slopes on the road to recovery.

To keep pace with the requirements which are being placed upon it, the Southern Appalachian region must undergo a deep-seated development along diverse and important lines. Unless all signs fail, this many-sided development is to be a thing of the near future. Underlying it and fundamental to the success of the whole scheme is the practice of forestry. Attempting to meet impending opportunities for permanent growth and development, without recognition of this fact, will be as expensive and shortsighted as trying to build a great dam on a leaky foundation.

Important Announcement

The next issue of AMERICAN FORESTRY MAGAZINE (December, 1922) will be called the "Lake States Number." Among others it will include the following beautifully illustrated articles:

A PICTURE THAT WALKED by Harold Titus
(Author of "Timber"—the most widely read novel on conservation)

HENRY FORD'S FOREST by Ovid M. Butler
(Forester of the American Forestry Association)

MICHIGAN'S FIGHT FOR FORESTS by P. S. Lovejoy
(Nationally known author of forest and woodland articles)

THE ROAD TO WISCONSIN'S GREATER OUTDOORS by Henry C. Campbell
(Assistant Editor of the Milwaukee Journal)

THE FOREST WHERE THE MISSISSIPPI BEGINS by D. Lange
(Author of "The Lure of the Mississippi")

IMPORTING REINDEER TO MICHIGAN by Albert Stoll
(Popular writer and Secretary Michigan Conservation Commission)

A BIT OF OLD WISCONSIN by Judge Asa K. Owen
(President Northern Lakes Park Association)

THE FIRE CALL OF THE NORTH WOODS by William T. Cox
(State Forester of Minnesota)

Governors of Michigan, Wisconsin and Minnesota in personal statements on forestry in their States

Several Other Splendid Articles

DON'T MISS THIS ISSUE. Send us a list of your friends to whom you would like a copy sent. Extra copies 40c postpaid. Subscribing membership in the American Forestry Association, including Magazine, $4.00 a year.

American Forestry

WASHINGTON, D. C.

(Largest Circulation and Most Widely Quoted Magazine on Forestry, Wood Uses, Lumber and Trees in the World)

FERNOW HALL

By Ralph S. Hosmer

Professor of Forestry, Cornell University

TO everyone interested in forestry in America the honor recently conferred on Dr. Bernhard E. Fernow by the trustees of Cornell University will seem a fitting recognition of real and substantial accomplishment.

On the afternoon of October 5, 1922, there was unveiled at Ithaca, New York, over the entrance of the Forestry Building on the Cornell University campus, a tablet bearing the words "FERNOW HALL." The naming in Dr. Fernow's honor of the building where is taught the subject that he organized for instruction in this country was authorized by the trustees of Cornell University on June 20, 1922. The unveiling of the tablet on October 5 was marked by addresses by Dr. Livingston Farrand, president of Cornell University, Dean A. R. Mann, of the New York State College of Agriculture, and Professor Ralph S. Hosmer, head of the Department of Forestry.

By an interesting coincidence two of Dr. Fernow's sons are now connected with Cornell, one as an instructor in the College of Engineering, Mr. B. E. Fernow, Jr.; the other as a graduate student in Plant Pathology.

CORNELL HONORS DISTINGUISHED FORESTER

Entrance to the Forestry Building at Cornell University dedicated to Dr. B. E. Fernow.

To the latter, Mr. Karl H. Fernow, fell the pleasant duty of pulling the cord that raised the flag covering the tablet bearing his father's name.

The building hereafter to be called FERNOW HALL was erected through a special appropriation made by the legislature of the State of New York in 1911. It was dedicated in May, 1914, and since then has been the home of the Department of Forestry of the New York State College of Agriculture at Cornell University.

It seems peculiarly appropriate that Cornell University should thus honor Dr. Fernow, for it was at this institution that there was established under his direction, in 1898, the first school of forestry on the American continent, the old New York State College of Forestry at Cornell University. Although suspended in 1903 as the result of an unfortunate controversy that arose in connection with the college forest in the Adirondacks, the old New York State College of Forestry has a notable record. There was never the least criticism of the instruction given at the college. On the contrary, the best evidence of the value of the work that Dr. Fernow did in organizing a professional forestry curriculum is to be found in the fact that the general program of study that he established at Cornell has become the basis for the standardized curriculum of instruction in forestry that is now followed by all the leading forest schools in the United States.

In this connection it may be interesting to note that of the seventeen men who were graduated from the old New York State College of Forestry and received from Cornell University the degree of Forest Engineer, the fourteen now living are all actively engaged in the practice of forestry as a profession. A number of these men bear names that are well known both in the United States and Canada.

While at Cornell Dr. Fernow made another contribution to forestry in America that is of far-reaching importance, the founding of a technical forestry journal, the *"Forestry Quarterly."* In 1917 this magazine was merged with the Proceedings of the Society of American Foresters and given the name *"Journal of Forestry."* Dr. Fernow still remains its editor-in-chief. One of Dr. Fernow's most important books, "The Economics of Forestry," also appeared during the years he was teaching at Cornell. It is one of the most valuable books in American forestry literature and is as vital today as when it came from the press twenty years ago. Other of Dr. Fernow's books, outside of numerous government publications, are his History of Forestry, 1907, (3rd revised edition, 1913), and his Care of Trees, 1910.

But the achievements of Dr. Fernow do not rest alone on what he accomplished while at Cornell. His con-

tributions to the cause of forestry in America began much earlier than that. From 1886 to 1898 Dr. Fernow was chief of the Division of Forestry of the United States Department of Agriculture, the branch of the government that in later years developed into the Forest Service.

Dr. Fernow was the first technically trained forester to be employed by the government. Indeed, when he took that position he was literally the only man in the United States whose training entitled him to be called a professional forester. In one of his books Dr. Fernow says that the term forestry was then not even to be found in the dictionaries. He was indeed a pioneer in what in this country was a new field.

For twelve years Dr. Fernow labored hard, against many odds, to bring to the people of the United States a realization of what forestry is and what forestry practice seeks to accomplish. Hampered by meager appropriations and assisted by only a small staff, he nevertheless did a very great deal to lay surely and well the foundation of public sentiment in favor of forestry that at least in part made possible the rapid development that followed in later years.

Perhaps the most noteworthy event with which Dr. Fernow was connected during this period was the passage by Congress in 1891 of the law authorizing the President of the United States to set apart as forest reserves portions of the Public Domain. This is the fundamental law on which rest the National Forests of today. But during that twelve-year period there was hardly a project related to the development of forestry in which Dr. Fernow did not have a hand.

The readers of this magazine will particularly like to recall that Dr. Fernow was one of the founders of the American Forestry Association, at meetings held in Cincinnati and at Montreal in 1882, and that for fifteen years he acted as secretary of the Association and chairman of its Executive Committee. From 1885 to 1898 he was editor of the Proceedings of the American Forestry Association and of its journal, *The Forester*.

Dr. Fernow's ability as a forceful speaker and writer makes the list of his contributions to popular education in forestry a long one. It is out of place here to try to enumerate them. Enough to say that Dr. Fernow played a leading role in bringing to the attention of the people of this country the fact that forestry is a wholly practical subject and that it involved problems that have a vital bearing on our wellbeing as a nation.

In 1907 Dr. Fernow again broke new ground in establishing the first forest school in the Dominion of Canada. From that year until his retirement on account of age in 1919, he was Dean of the Faculty of Forestry of the University of Toronto, where he built up a forest school of high grade. Dr. Fernow has further served the Dominion by membership on the Canadian Commission of Conservation, where he has done active and valuable work.

At the time of Dr. Fernow's retirement from the University of Toronto, in 1919, as Professor of Forestry, Emeritus, *American Forestry* published a comprehensive article by Prof. Filibert Roth, dealing with his life work. It may be found in the issue of April, 1920. It seems unnecessary here to add further details. But one who has known something of Dr. Fernow's home life cannot refrain from mentioning in passing that it was a never-to-be-forgotten experience to be bidden as a guest to enter that delightful circle.

DR. B. E. FERNOW

Identified with forestry in America since its inception and the founder of the first forestry school on the American continent.

It had been greatly hoped that Dr. Fernow could be present in Ithaca at the unveiling of the tablet bearing his name, but continued ill health made that impossible. Dr. and Mrs. Fernow are now residing at 16 Admiral Road, Toronto, Ontario, Canada.

The action of the trustees of Cornell University in giving Dr. Fernow's name to one of the important buildings of the university was taken in recognition of Dr. Fernow's many and varied services to the cause of forestry in America. It is an honor that is merited by sterling achievement. To all American foresters it is a cause of rejoicing that this honor comes while Dr. Fernow himself can have the satisfaction of knowing that the work of his life is appreciated.

Dr. Fernow, in writing to Prof. Ralph Hosmer, of Cornell, in acknowledgement of the dedication, said:

"Once more allow me to express my great regret at

not being able to attend in person the ceremony of the dedication of your building and to return my grateful acknowledgements for the honor, to you and those instrumental in having my name connected with the stately building devoted to the teaching of forestry. This recognition of my services is particularly grateful in that it comes from the institution where my work as teacher began and which has always commanded my loyal interest.

"Had I been present I would have pointed out that my desserts are more than duly recognized by the handsome compliment of naming the building after me, and that it was only the accident of my being the first in the field and my persistence therein that gave me the proud position in which my friends have insisted on placing me.

"I would also have elaborated the fact that a teacher lives in his students and that the honor heaped on the former is earned by the doings of the latter and would have enumerated the graduates of the earlier years now occupying prominent positions. My pride is centered in them.

"To your students I would have recommended the adoption of my motto, borrowed from Horace, *Carpe diem*—do the duty of the day—with confidence in the due development of the future.

"The future for forestry seems full of promise and I would have congratulated all who are working in that profession."

Farm Forestry at the Berry Schools

ANNOUNCEMENT has been made by the Principal of Berry Schools at Mount Berry, Georgia, that the institution will offer a course in Farm Forestry. To all foresters and lovers of forests this comes as an important and interesting announcement, largely because of the character, reputation and plan of Berry Schools. Situated in the foot hills of Georgia, this School has for twenty years served in a unique way, the boys and girls of our Southern Piedmont Region. Early in 1900 Miss Berry, a young Southern woman, saw the need of an industrial and country life school, where the unfortunate but proud and very promising sons and daughters of our Southern highlanders could secure an education fitting them for constructive life and citizenship. The birthplace of Berry Schools was a cabin in a grove near Martha Berry's home. In 1902 a small school house was built on property given her by her father, and the Martha Berry Boys' Industrial School began its term of service. Today there are three schools; one serving the boys, another for the girls and another which is the Mountain Farm School, where foundation training is given to those boys who have never had a chance. The campus, farms and wood lots cover approximately six thousand acres and there are nearly ninety buildings. A remarkable growth from a small log cabin on one's home estate.

To these schools come young people from all over our rural and mountain South, each seeking a knowledge of life and character. From these schools back to their home communities, go young men and women who have learned how to live and be useful. With the ideal of service foremost, they return to their homes to give the best they have that others might live.

Each student is required to work and thereby earn a portion of his expenses; others by working earn all of their fees. This work takes them into the farm, the wood shop, in the kitchen and on construction jobs. Now some will find employment in the woodlots and

THIS TREE ON THE BERRY SCHOOL CAMPUS HOLDS A TABLET ON WHICH IS WRITTEN JOYCE KILMER'S EXQUISITE POEM ENTITLED "TREES."

learn by doing how best to establish and perpetuate such lands. On the campus everything has been done to help the students understand the beauty of trees and to love them for their great lesson of life. This work has been carried on and supported financially entirely through the efforts of Miss Berry, who is untiring in the struggle to raise money so that some might have the advantage which has been denied many. Unfortunately, funds are sometimes a little slow in coming, and a great many must be refused entrance to these remarkable schools.

Miss Berry is to be congratulated on this last move towards helping our people to a better understanding of the value and use of our forest lands.

FOREST PROBLEMS OF GEORGIA'S HARDWOOD REGION

By E. H. Frothingham

Acting Director, Appalachian Forest Experiment Station*

BECAUSE of the remarkable extent and value of the original pine forests and their spectacular decline, forestry in Georgia has quite properly become associated very largely with pine and turpentine. Georgia pine lands undoubtedly command first attention; but no forest program for Georgia can afford to neglect the great resources which the State possesses in its millions of acres primarily adapted for the growing of hardwood forests.

Hardwoods are important elements in most of Georgia's forest regions, with the exception of portions of the great pine land areas in the southern part of the State. They are an item of value in the river swamp forests of the Coastal Plain, and play a part in the farm woodlands of the Piedmont Plateau. The true home of Georgia hardwood forestry, however, is in the mountain region, occupying about the northern one-tenth of the State.

This region is a notable part of Georgia. It is unexcelled in the State for scenic beauty, climatic attractiveness and recreational possibilities. It is unique in the value of its potential and applied waterpower and the richness and variety of its forest vegetation which stands at the source of this power. Its highest mountains bear the southern extremity of the spruce forest which follows down the Southern Appalachian Mountains from Canada. The white pine and hemlock, sugar maple, beech, and birch of the northern forest meet and mingle in its coves and slopes with a wealth of oaks, hickories, and southern hardwoods such as yellow poplar, cucumber and the gums. The upland pines—pitch, shortleaf and Jersey scrub—still further increase the variety of mixture and the number of forest types with which forestry in this region must deal. The great number of commercial species thus brought together present a complicated series of problems as to both utilization and silviculture. In the future forest management of the region, the harvesting of the maximum values in quality and quantity from these lands will demand an intimate knowledge of the life habits,

THE PRESENT FORESTS ARE IRREGULAR AND POORLY STOCKED, AND ONLY PRODUCE A FRACTION OF WHAT THEY MIGHT IF THEY WERE PROPERLY CARED FOR.

*Read before the Georgia Forestry Association at Macon, Georgia, June 7, 1922.

growth, and requirements of the different kinds, and the relative value of their products.

Rich as these forests are in valuable species, they have been left in bad condition as a result of lumbering and recurrent fires. Very few remnants of the original forest remain. Over large areas the forest has been successively culled of its better species, and the poorer species left behind have often closed their crowns together and shut out the light needed for successful reproduction. Stands which, from a distance, have the appearance of luxuriant virgin forest may be found to consist chiefly of more or less defective trees of the less valuable species, with here and there a crippled and unmerchantable representative of a better kind. Of late years, with the increase in value of lumber and other wood products, cuttings have been heavier, amounting, in prosperous seasons, practically to clean cutting. Provisions for the reproduction of valuable species have been generally lacking and the way has been clear for the development of a second growth of less desirable species. Forest fires have burned repeatedly over large areas, damaging timber and second-growth, implanting seeds of decay and impairing the fertility of the forest soil.

We are at present at a low ebb in the history of our forests. The original stands are practically gone, their place is occupied very largely by decrepit culled forest, burned-over slashings, and inferior second-growth, and fires are still frequent and destructive. Before we can think of practicing intensive silviculture or management in the hardwoods a transitional or introductory stage of forestry must be traversed. The problems of this introductory stage are mainly economic, legislative and educational. Colonel Greeley, in his address before the Third Southern Forestry Congress at Atlanta last year, pointed out what these fundamental preliminary steps must be. In their larger features they are much the same for all forest regions. They consist of measures to ensure fire protection, equitable tax laws, and other means to promote the holding and improvement of forest lands for future yields, and they also include simple and inexpensive silvicultural processes in lumbering, aimed to establish the beginnings of commercially useful stands of second-growth. These are the much discussed "minimum requirements," now the subject of study by the Forest Service throughout the country. In the southern Appalachian hardwood region, of which the mountain hardwood lands of Georgia are a part, these simple "first aid" measures consist only of such things as the ample

A FAR LOOK OVER THE SOUTHERN APPALACHIAN FORESTS. THE SCENERY IN THE MOUNTAINOUS SECTION OF GEORGIA IS UNEXCELLED, AND THE REGION IS UNIQUE IN THE VALUE OF ITS POTENTIAL AND APPLIED WATERPOWER AND THE RICHNESS AND VARIETY OF FOREST WHICH GUARDS THE SOURCE OF THIS POWER.

THESE FORESTS WILL NOT ONLY GROW TIMBER, BUT THEY ARE ALLURING PLAYGROUNDS FOR THE EVER-INCREASING POPULATION OF THE EASTERN SEABOARD. THOUSANDS OF PEOPLE POURED INTO THE NEWLY ESTABLISHED NATIONAL FOREST REGION DURING VACATION TIME OF THE SUMMER JUST PAST.

safeguarding of cut-over areas against fire and grazing, coupled with the leaving, in logging operations, of a few seed trees and the elimination of at least a part of the defective trees and inferior species which are sometimes left in considerable numbers on lands from which the cream of the timber has been removed.

These measures, if effectively carried out, will undoubtedly yield good results on the lands which still remain to be logged, but the restoration of the badly depleted hardwood stands is another matter. Only time and careful treatment in the preservation of all available seed supplies of the better species, and the provision of favorable light conditions for the best elements of the reproduction, will avail to replace the crippled and burned second-growth with an active, healthy, growing stand. The proportion of weed-trees and low-grade products must be diminished, in such ways as become available, for the benefit of the value-producing species. Gradually, the forest will reassert itself, if protected, and under proper guidance a new forest of superior quality will ultimately develop.

Assurance of healthy second-growth of commercial value is the foundation of the second step in forestry in the mountain hardwoods. This step will consist in the organization of the forest as a factory for turning out the greatest quantity of the most useful forest products. It will provide for a perpetual annual or periodic yield from unit areas, such as individual watersheds or groups of watersheds. To carry out such a program successfully, there can be no failures due to ignorance of the behavior of the species under management. The problems involved in this second stage of hardwood forestry in Georgia are accordingly highly technical. They involve studies of the life histories of the many different species which make up the stand—their reproductive capacities, soil requirements, rate of growth, toleration of shade, and behavior in competition with trees of the same or other species in the forest. Economic factors are introduced, as in determining the period of rotation needed to produce specified products, and the times at which thinnings can profitably be made for the benefit of the forest. Such studies are indispensable to the placing of the proper trees on the proper soils, so that each acre can produce its maximum.

To summarize, the first step in forestry in Georgia's mountain hardwoods is largely economic and legislative, and its purpose is to give us a growing stock to work with. The second step is the regulation of the yield of this growing stock in unit areas, coupled with more intensive silviculture than can be practiced under present limitations. The second step will follow hard upon the first—in fact, on our National Forests, of which Georgia claims a share in her mountain region, we are already entering upon the stage of forest regulation, and are beginning at the Appalachian Forest Experiment Station, the studies of the reproduction and the phases, the opportunity thus offered, and analyses are being made of the results of some of the early endeavors. In addition, however, the program of the Station for the current year carries a number of projects dealing with the management of the mountain hardwood forests. It is significant that with but one exception these projects deal with the two subjects of hardwood reproduction following cutting, and forest protection. These subjects are related properly to the introductory phase of forestry, and reflect the need for immediate information upon the preliminaries of forest practice. This, however, is in the nature of preparatory

YELLOW POPLAR IS EAGERLY SOUGHT BY THE LUMBER INDUSTRY. IT SHOULD NOT BE EXTERMINATED FROM THE FOREST BY CONSTANTLY CULLING IT OUT FROM AMONG OTHER SPECIES.

growth of the forest in relation to logging which must underlie a sound and successful program of timber raising.

The Appalachian Forest Experiment Station, which was established at Asheville, North Carolina, last July, will work primarily on the problems which are arising in connection with the mountain and Piedmont forests. Asheville, situated in the heart of the Southern Appalachian hardwood region, less than 60 miles from the Georgia line, has been called the "cradle of American forestry," for it was there that some of the earliest work in forestry on this continent was done. The work at the station has naturally followed, in its opening work, and as rapidly as it is cleared away the Station will concern itself with the maze of technical problems which relate to the intensive phase of forestry which is inevitably approaching and may not be so very far in the future.

Georgia is now, it is to be hoped, at the threshold of a forestry career. Before proceeding further it would be well to consider the relative timeliness of the two classes of problems which have been touched upon in this paper, and the emphasis which each should receive at the present stage in forest work in Georgia. There is just a bare chance that a forestry program just hatched might suddenly discover itself, to its de-

cided embarrassment, to be blessed with a whole corn appetite and a soft mash digestion or, on the other hand, to have inherited a controlling mental complex in favor of always remaining a mere chick. There is a normal course of development which a rightly initiated forest program will necessarily follow, because it will have inherited a proper sense of proportion. A program should be properly balanced to take full account of future needs, but it must not start off too far in advance of the times to keep its feet squarely under it. There must be adequate provision for technical studies from the outset; that is essential. But what must be stressed at the beginning are the problems which surround the first stage in forestry, which must be solved before research work in forestry can be assured of its ground.

Intensive silviculture must grow up with the second-growth. The pervading influence of our late lamented virgin forests, the present deep-seated and in-grown methods of large-scale exploitation, the prevailing conditions of demand and supply of wood products and, above all, the great forest land areas that demand attention, do not form a combination favorable to intensive practice. There is something much more immediately important for the as yet totally uncared for portions of Georgia's hardwood land, and that is to get results, no matter how modest, on all this land. No matter how much we may resent the present competitive logging methods with their disregard for anything except immediate income, we are forced to take them into account. If they are to be modified in the near future we may be sure it will not be by an abrupt transition to intensive forest practice.

The second-growth period of forestry is at hand all over the country, following the lead of New England. The obvious thing to do is to establish second-growth on a large scale. We shall get a proportion of tree weeds, no doubt, and the new forest will be very far from perfect. It will be for the silviculture of the future to make it an efficient and smoothly running means of continuous supply. What we are after is a new forest in which forestry of our own devising and adapted to the needs of each forest type and each local community with its peculiar industrial demands, may be practiced. The public requirements on forest lands, which are now being formulated, will give us definite means for securing this workable new forest of second-growth.

The conditions established by the minimum requirements may be taken as the balanced judgment of nearly a generation of foresters, or at least such as have written records of their findings. The requirements fixed upon as the minimum have come into being after a deliberate culling from a large group of possible methods, some of them more desirable but too advanced for present practice, so that the regulations established are not empirical in their origin. If we are ready to accept the premise that to bring our wild lands into some producing condition is but a preliminary step in more intensive silviculture practice, we have made a great stride. New methods can then be tried as they should be, on experimental areas by specially equipped investigators, and the general application of theories to large areas will cease, pending proof by actual trial. With a knowledge of minimum requirements we shall have something definite to work with, which we know will, if effectively carried out, produce the broad results that are our immediate need.

A Tribute to Loyal Service

Roy H. Goodell, a Forest officer employed by the Forest Service on the Washington Forest, was killed on the evening of July 6, 1922, by a large boulder while he was in the act of putting out a fire with a shovel and by the use of soil. Shortly after the fatality Mr. L. H. Pederson, a welfare worker at the City of Seattle power camp, learned of the occurrence, inspected the conditions surrounding the death, and on account of the deep impression that he received at that time wrote the following memoir which is a grand tribute to the loyal service rendered by a humble Forest officer.

"With Shovel in Hand."

Killed—with shovel in hand—
A Forest Officer.

Worn with sleepless nights and days of care,
Just back from the towering peak,
Where he searched over canyon and glen for a "smolder,"
Down a thousand steps, o'er the dizzy cliff,
To trample it out with scorched feet—
Then up again to challenge the eagle
In searching the smoky haze.

Where the cooling shade and tumbling brook
Refreshed laden beast and man;
Where the songsters of heaven and their furry friends
Played fearlessly hide and seek;
Where the boulders were softened with lichens and moss
And shielded the blossom and fern;
Where the Gardener Divine for age upon age
Had labored and planted and grown,
A blast as from hell in a moment of time,
Has spewed its flame-scarred wreck,
There he worked, there he fought,
There the boulder shot like the lightning bolt
And struck him down, with shovel in hand.

Like him would I go.
Whether I work with shovel or ax,
With square, with lathe, or with hoe,
May my body be soiled with the grime of its toil,
And my hands be scarred with its flame;
Though my face be so marred that they know me not,
And the conflict my body has torn,
May stranger and friend say of me as of him—
"He fell with his shovel in hand."

—*L. H. Pederson (Parson Pete).*

May we all redeem our every responsibility that the Service may receive such unsolicited praise from the public whom we serve.

GARDEN LORE

BY CLIFFORD ALBION TINKER

ENGLISH landscape architecture, so natural in its conception, so generally perfect in its execution, is a delightful adjunct to the semi-formal British civic center; a glorifying feature of the vast and ancient baronial estates; and a harmonious addition to the rustic countryside. Framed in by skilfully arranged trees and shrubs, or sweeping away in undulating richness, are the beguiling lawns, forever inviting a romp, or suggesting a Maypole and happy, beribboned children.

Each lawn has its own peculiar beauty; but the grass of all is the greenest, the clover is the most deliciously crisp, and the wayward, dotting little blooms are the sweetest of any in the world. The only rival of this verdant loveliness is found in the green swards of the fog-bedewed New England Coast.

There is a climatic similitude which is the heritage of Old and New England alike, for Dame Nature, peculiarly generous, by her handmaiden, the Gulf Stream, dispenses with a grand and misty flourish her loving favors equally on both the Briton and his Yankee cousin. This similarity of climate finds its most impressive expression in a similarity of verdure which is most strongly marked among the deciduous shrubs and trees, giving New England and the British Isles their characteristic and beautiful natural landscapes, and the indigenous herbaceous annuals and perennials so dear to the New Englander have been at home in England for centuries.

While the English landscape architect has an abundance of deciduous trees at his disposal, which he uses with telling effect, he finds himself more or less handicapped by lack of native conifers. The Scots' pine and the juniper, together with the yew, which last is possibly not a conifer at all, make up the list of natives, the list, however, being somewhat expanded by importation of conifers from other lands.

In the language of the botanist, the yew is a dioecious tree or one having the peculiarity of bearing male and female blossoms on separate trees, although sometimes a yew is found which has one or several branches whose flowers are of the sex opposite to those which cover the greater part of the tree, while added to this are other peculiarities which make yew trees one of the most characteristic of all the trees of Britain.

The yew attains great size and unconscionable age; one in the church-yard of Fortingal, Perthshire, is over two thousand five hundred years old, while another in Hedsor, Buclas, measures twenty-seven feet around and

A COTTAGE HOME, SET LIKE A JEWEL IN A LOVELY GARDEN

The English landscape architect by accepting nature as his guide has made a bower of his "tight little isle" and given to the world the most perfect example of intimate little gardens for the cottager.

Photograph by Judge, London

A VISTA AT HAMPTON COURT

Hampton Court Palace is surrounded by entrancing gardens, embellished with art objects of priceless value, but the glory of the historic old place is its oak trees, ancient and towering, and expressive of England, old and new. Under the springing arch of this noble old oak is glimpsed a vista of that part of Hampton Court designed by Sir Christopher Wren.

is said to be three thousand two hundred and fifty years of age; still another, not in England, however, but sometimes called "the oldest living thing on earth," is the giant yew at Chapultepec, Mexico, measuring 120 feet around the bole, and boasting the hoary age of six thousand two hundred and seventy years!

The yew is far from graceful in proportions, but it is a robust, strong-limbed tree with a devil-may-care angle to every branch, an air of obvious independence, and gives the impression of strength and endurance. Although not poisonous, the yew is credited by many with that dangerous and disagreeable quality, and thus its name in the form of *toxicum* is used to designate all poisons.

This peculiar tree is famous in song and story, but is more at home in legend and history; for, indeed, its tough old branches furnished the remarkable long-bows of the valiant English archers and cross-bowmen who fought with grim success at Agincourt, Crecy, Orleans, Palestine, and on many other foreign fields and domestic battle grounds. History without the stout yew-bow would lose much of its engaging romance as far as England is concerned, and the British legends would be a very different article had the yew tree not found Britain a friendly soil.

The Sherwood Forest yews provided Robin Hood and his rollicking band of woodsmen with their thrice-dreaded long-bows, and when the gallant outlaw leader was about to die he shot an arrow from a window of Kirkley Hall with the injunction to his faithful lieutenant, Little John, "Bury me where the arrow falls." A swift flight and the shaft fell at the foot of a yew in the churchyard, and there, as he had entreated, the romantic hero of the "Forest Tales" lies buried.

As the yew grows, it is continually sending up shoots from the lower part of its bole, and as these shoots enlarge they take an upright position, finally adhering and coalescing with the older growth, until the tree presents the appearance of having several trunks more or less grown together, and one, standing before a giant yew, may readily see whence came the popular idea that the yew trunk served medieval builders as a model for the clustered columns of their cathedral aisles.

Photograph by Judge, London

TREES ARE USED BY THE ENGLISH LANDSCAPE ARCHITECT WITH TELLING EFFECT

Yew, oak and plane are combined in vista effects around about old Canterbury, and close to the ivy-covered walls are those old-fashioned flowers of age-long appeal, which shed a brilliancy all their own in nook and corner, imparting that delightful touch so familiar in English landscape work.

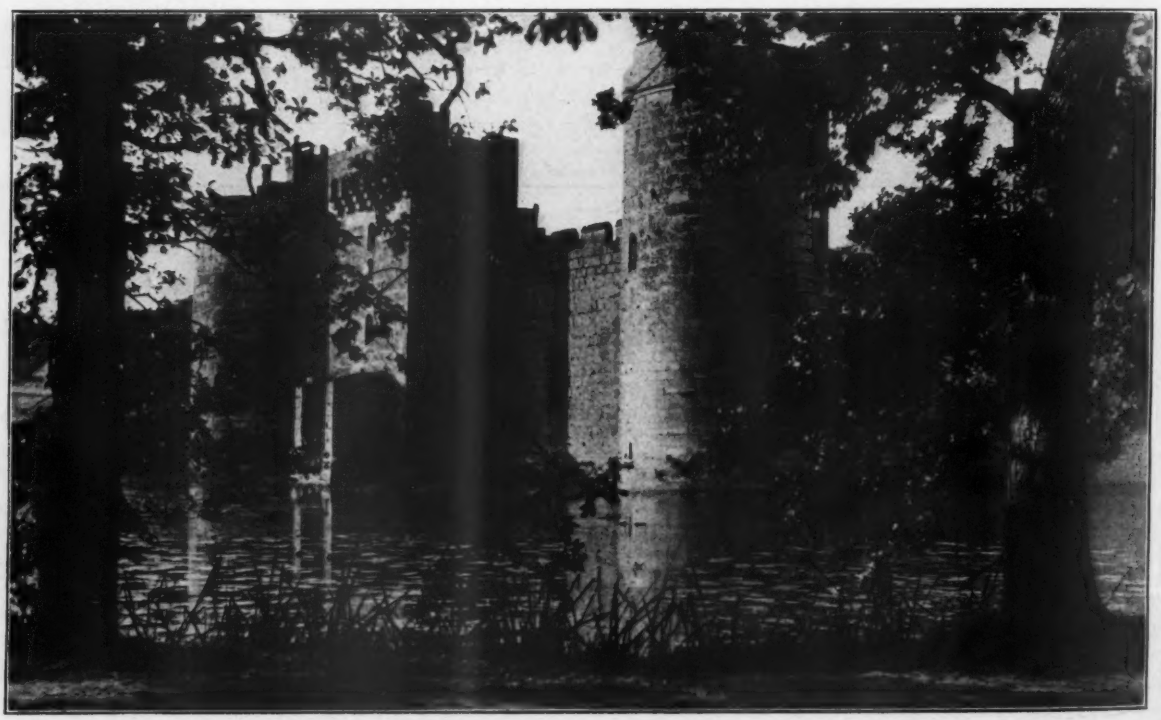
Photograph by Judge, London

THE VINES OF OLD ENGLAND ARE PROFUSE AND GORGEOUS IN THEIR BRILLIANCY

The little countryside chapels and churches seem to grow out of the ground, so wonderfully have the landscape designers handled the mass of verdure indigenous to the British Isles.

Religious significance has always attached to the sombre yew, it is a tree for the burial ground and was planted therein as far back as Egypt of the Ptolemies, from whence its funeral use spread to Greece and Rome. Yew was carried at funeral processions, was the wood used in the cinerary fires, and was placed in the graves before the body was committed; this last ceremonial rite still exists in the Egyptian custom of spreading basil over tombs, in the Masonic service where acacia is cast into a grave, and in the almost universal usage of lining graves with green boughs to relieve the harshness and chill of the fresh dug earth.

The yew of the present-day landscape architect is an ornamental variety, the Irish yew, which differs from the old type and grows more erect like the Lombardy poplar, with a slight bole and scattering leaves, instead of two rows of leaves on each bough and a built-up bole like the English yew. The Irish tree is used for new planting, but when a rugged, striking specimen is needed, the architect hunts out a reddish, thin-barked old bow-



Photograph by Judge, London

REMINISCENT OF THE BOLD AND GALLANT DAYS OF RUPERT OF HENTZAU

But no matter how rugged the castle, how bold and bleak its sides, or how forbidding its moat, it cannot express more strength and dignity than the famous oaks of England. Around Bodiam Castle, here pictured, are huge oak trees centuries old, which frame the famous structure from every angle of approach.

yew and plants something worth while. While the yew is supreme among the Briton's evergreens, the king of decidious trees is the English oak, a proud and sturdy tree, supposed to typify, by its time and storm-weathering qualities, the very essence of British character. It does. Its solitary and individualistic tendencies, often living alone, here and there, in the fields and forests, with its mates at a distance; with dignified, symmetrical outlines and with utter disregard of storm or circumstance. In these matters it surely portrays, graphically, the true Englishman. "Heart of Oak"—the song—the story—that is England. Not that England is alone in this; for we have our oak trees, too. And they are every whit as sturdy, every whit as symmetrical, every whit as symbolic of national character as their English brethren; they only lack appropriate recognition; and more attention at the hands of artists and authors will place the American oak where it belongs, at the head of the list of America's deciduous trees.

A VILLAGE STREET IN OLD ENGLAND

Such architecture, so natural in its conception, so generally perfect in its execution, is a delightful adjunct to the semi-formal British civic center. One can almost see the lovely color scheme here—the brilliance of the hardy annual flowers against the soft neutral tones of the building groups and background.

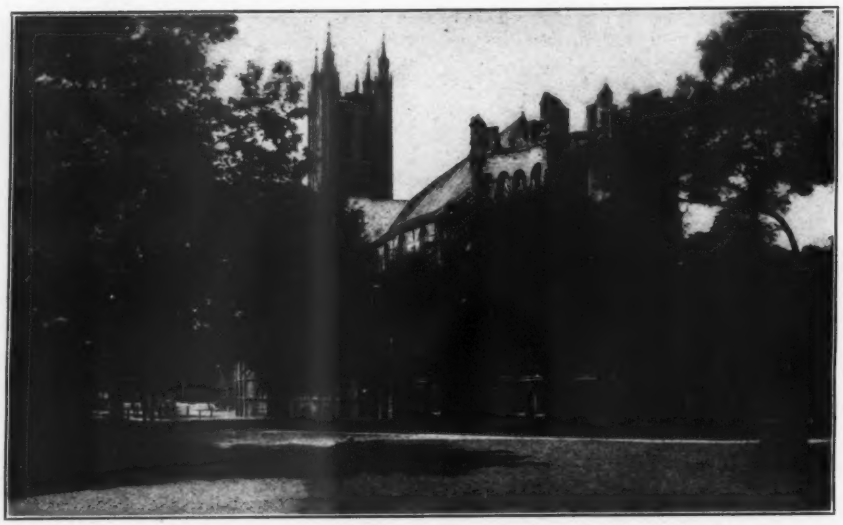
The English oak, even more than the yew, is part and parcel of the romantic history of the Island Empire, and has been the theme of as much grandeloquent speech and laudatory composition as any other one thing produced in Great Britain. The oaken hulls of the ceaseless fleets of merchantmen, the oak-timbered line-of-battle ships, the backbone of British sea power of earlier days, recalls the conjuring names of the mighty sea-kings of long ago; Raleigh, Hawkes, Drake, Nelson, and hundreds of lesser lights have inspired many a volume, and the strength of glorious and heroic tradition therewith associated has as strong an appeal today as ever—the battered and sunken hulks at the moles of Zeebrugge and Ostend gives abundant proof.

Universally the oak is a symbol of strength, for Jove called it his own; the tribes of the North dedicated it to Thor, and early and primitive peoples worshipped it as a sanctified expression of diety. We can hardly wonder at this worship when it is considered what importance the oak assumed in the economic affairs of the ancients; furnishing the people with dwellings, tools, arms, ships. fuel, and food.

The Classics are filled with references to the oak; the prow of the Argo was fashioned from a speaking oak of Dordona, and it retained the power of speech even when at sea, directing the Argonauts and telling Jason the need of purging himself of the blood of the murdered Absyrtus. Erysichthon was condemned to lasting hunger by Ceres for cutting down an oak in her garden and killing the nymph who lived in its giant trunk; and because of the regal strength and appearance of the oak it was singled out by Jupiter when he cast his thunderbolts of displeasure at the human race, originating the

fiction that oaks are more often struck by lightning than other trees.

The Bible and many Hebraic and Christian legends give the oak a prominent place in the chronicles and early history of the Jews and the followers of the Nazarene. It was under the shade of an oak that Abraham met the angels; an oak covered the suicidal body of Saul and his dead sons; Jacob used a friendly oak as the hiding place of Shecheml's idols, and David's rebellious son Absalom was caught by his flowing hair in the branches of an oak. From the oak was fashioned the Cross of Golgotha, and, thus accursed, by dying with the Savior, was forgiven by Him, accepted by the Disciples, and finally became sacred as the Tree of Mary.



Photograph by Judge, London

A MAGNIFICENT SETTING

Framed in by oak and yew trees, the beautiful stone work of Canterbury Cathedral serves as a foil for the multi-colored green verdure, and is a delight to the eye.

Beneath the oak the Druids carried on their mystic rites. The name *Druid* is from the Greek, *drus*, a tree; first the name *Dryad* was derived, later changed to *Druid*, and from the dryads sprang the belief in fairies, who lived in hollow oak trees. *Druide* is the Gaelic name for oak. In Ireland, the two famous Saints, Bridget of Kildare and Columba of Kenmare, lived in hollow oak trees; while by the credulous children of Erin the oak was held to be a sure cure for many ills, and this belief was carried to the extent that it was said if the guilty could but secure a fragment of the "Oak of Saint Colman" to hold in his mouth he was safeguarded against hanging.

In all lands are legends inspired by the oak and in all lands are famous specimens which are interwoven with local or national history; in England the Parliament Oak and the great Oak of Robin Hood; across the turbulent Channel is the Volkenrode Oak of Gotha, and the Oak of Saintes, France; in America is the Charter Oak at our own Hartford, and the old Natick Oak which sheltered John Eliot while translating the Bible into Algonquin.

The idea culminating in the giant wooden statue of Hindenburg, into which nails were driven by the Germans in an effort to raise war funds, came from a Teuton custom carried out in Vienna, where the famous oak, "Stock am Eisen," stands and into which apprentices, when starting on their careers as journeymen, thrust a nail for luck.

Can you wonder that the British landscape architect, knowing the wealth of tradition and intimate history connected with the oak, and with its great beauty and strength, dotes on its use as he plans and works into shape the gardens and parks of his beautiful isle? Many varieties are found in England, some of them importations, and the architect is not limited in the use of this tree, but may select innumerable types of leaf, coloring, and size to carry out the simplest or most ambitious effects which his talents dictate.

Among the flowers in England, the rose is queen. Gorgeous example of the *Rosaceae* family, cultivated, dignified, over-poweringly sweet, and everywhere present, are used with brilliant effect by the architect and florist. Of course, England has no monopoly when it comes to the rose; originating in Persia, it has spread wherever beauty has meaning and appeal. Think of the roses of Japan, of India, Italy, Spain, France, America, far-away Iceland, and the Islands of the Sea; to-day all the world is its habitat.

And does not the rose recall the barges of the ancients, and the galleys of old Venice? Attar of roses, candied petals, cologne, sachet perfumes, and a thousand and one delights of the boudoir come to mind with memories of the rose in those ages of silks and satins, and cloth-of-gold, when Venice ruled the waves. For the rose is the theme of poets, the test of the painter's artistry, the handmaiden of the romanticist. Did not old Ben Johnson sing:

"I sent thee late a rosy wreath,
Not so much honoring thee,
As giving me a hope, that there
It could not withered be.
But thou thereon didst only breathe,
And sendst it back to me,
Which since it grows and smells I swear,
Not of itself, but thee!"

But the crotchety old chap was really stealing his song from the Greek poet Philostratus, who, twenty centuries before the bucolic Ben was born, wrote this:

"Although I send a perfume rare,
'Tis not of grace to you I send it;
The—gain is to the gift I swear,
Although I send a perfume rare;
'Twill earn a sweeter fragrance there,
Than any power but yours could lend it;
Although I send a perfume rare,
'Tis not of grace to you I send it."

Ancients and moderns—all peoples—when wishing to laud their wives, sweethearts, and mistresses compared them to or exalted them above the loveliness of the rose. Dionysius, in the year 190 B. C., waxed eloquent and wrote his beloved the following:

"Which roses do you offer me,
Those on your cheek, or those beside you?
Since both are passing fair to see,
Which roses do you offer me?

Did not Meleager the Greek, in his "Garland," liken the beautiful lines of Sappho's lyrics to the "Rose petals of song"? And many appreciative musicians have given us sweet songs of roses; recall the melting, plaintive melody and the haunting words of "The Last Rose of Summer"; and the quick-witted composer who wrote the ballad of the "Wild Irish Rose" gave us no mean pleasure; history, romance, song, the deepest sentiments of religion and life, are all affected by the rose, and to it we pay homage. Legends in untold numbers crowd the folklore of all lands in which the rose is always the symbol of beauty, goodness, and gracious loveliness.

But enough of particularization; one can multiply *ad infinitum* references of the rose's beauty, and of the sweetness of the violet, too, and the idyllic purity of the lily, and the countless virtues of one's favorite flower; all flowers have their appeal, as the Creator intended.

And other trees than the oak and yew possess much beauty and find a worthy place in the English landscape; the beech, the plane, the glossy-leaved red-berried holly, the dignified elm, maples, pine, birch, thorn, chestnut, lime, locust, many varieties of willow, and other trees common to our own hillsides and valleys thrive in foggy England. The shrubs are many and of singular beauty, they correspond very closely to our own species, and great is the variety of coloring, both leaf and flower, and the British architect has cunningly used their various differences for brilliant and alluring effects in his mass plantings and his borders and covers. Annuals and perennials, such as the bronzy-leaved hollyhocks and old-fashioned plants of striking color and proven hardiness, are used prodigally, and aquatics are plentifully indulged in, especially in the more formal work of the large estates.

With all the wealth of naturally grown herbage and hot-house hybrids at his disposal, it is small wonder that the English landscape architect, by accepting Nature as his guide, has made a bower of his "tight little isle" and given to the world the most perfect example of intimate little gardens for the cottager, as well as the glorified creations of his art which surround the huge manor houses and estates.

Again, in the architectural and sculptural embellishments of the garden, the Briton has surpassed most of his competitors; the stone walls which give privacy and dignity, the immense gates which invite hospitality, the fountains, the statuary, the pools, the dials, the hedges sheltering the garden seats, the inviting arbors, the tea houses, the bird shelters, and all the ingenious schemes for entertaining and resting the host and his guests are found in abundance and beauty in the English garden; those quiet nooks where lovers find seclusion, where the student may pore over his books without interruption, and where the bird lover may seek his feathery friends.

The landscape architecture of England is entirely suited to our own country, and many portions of the United States have even more favorable landscapes and climate for the English style of natural planting and for formal architectural treatment and embellishment than England herself. Can we not have more of this beautiful work? It is as natural for us as for the Briton, just as natural for us to use and profit by the work of the English landscape artists as for us to speak the English language. Certain portions of the West and South are more suited to French and Italian gardening than that of the English, but the greater part of our country, with its varied flora and diversified countryside, is ripe for the gardens of Old England; and when we plant, let it be tree or shrub or flower, we will derive a more intimate pleasure from our finished park or garden if we, like the Briton, make an effort to know the history and romance of the species used, for the plant, like a good Samaritan, gives more than it receives.

Why Scientists Use Latin Names

The oaks afford an excellent illustration of the need of a system of nomenclature of plants and animals uniform throughout the world. In Germany the oak is known as *Eiche,* in France as *Chene,* in Spain as *Roble,* in Denmark as *Eg;* but throughout scientific literature whether written in New Zealand or Scandinavia, the genus is designated as *"Quercus."* On the other hand some South American and Australian woods not classed by botanists under the genus *"Quercus"* have had the common name of "oak" applied to them because they are heavy and strong.

The confusion among common names is still further increased when designating individual species. About 250 species of oak are known throughout the world. The name black oak is applied to at least six different species, yellow oak to two, and tanbark oak to three distinctly different oaks. Among scientists *Quercus velutina* Lam. (the last word referring to Lamrack who first named and described it) means but one species and obviates any confusion that might result by referring to the species as black oak.—*The Log.*

THE WOODPECKERS: BIRD FRIENDS OF OUR FORESTS

By R. W. Shufeldt, M. D., R. A. O. U.

Fellow American Ornithologists' Union, Etc.

THERE are no woodpeckers in Madagascar, nor do any occur in the avifauna of any part of the great Australian continent. Upon the other hand, we meet with representatives of this most interesting group of birds in all those areas of the world where we find forests of sufficient extent to attract them—places where they can obtain such food as they customarily live upon.

In the present article it will be shown how many kinds of these truly beautiful forms we have in the United States, for altogether there are no fewer than forty-six species and subspecies of them in the "Check List" of North American Birds, issued in 1910. Still others may have been described since that date, and a few more may be discovered in the future as inhabiting the least known parts of our country.

For generations past, many biographers of birds throughout the world have published figures and accounts of this order *Pici* or of the main family of it—the *Picidae*. Their various plumages; their habits; the appearance and growth of their young; their nest and eggs—in short, all about them is more or less known to professional ornithologists, and, to some extent, to those interested in a general way in our birds.

Personally I have never traced the vernacular name applied to the members of this group, nor do I know who first called them woodpeckers. It must be a term of very early origin, for these birds constitute an ancient assemblage; and, as their habits have not changed within the recollection of man, the name, or its equivalent in several languages, has long been applied to them. Indeed, their most conspicuous habit is to "peck" away at the bark and inner wood of a great variety of trees, and this they do for two very different purposes. When the wood is dead and decaying, these birds attack it with their strong and in some species powerful bills in their quest of insects and grubs that hide in it, as it is upon these that woodpeckers subsist. Less often they obtain similar food from trees that are sound and healthy, with, doubtless, more or less benefit to

OUR LARGEST WOODPECKER, THE IVORY-BILL

Fig. 1. This magnificent species, over twenty inches long, is on the road to complete extermination. It now occurs only in certain localities in the Gulf States. The male (to the left) has a splendid red crest, lacking in the female. Copied from a life-size oil painting by the author.

BLACK AND WHITE WOODPECKER

Fig. 2. An adult male specimen of Harris's Woodpecker, collected by Mr. Robert Ridgway at Truckee Reservation in Nevada (December 25, 1867), and now in the mounted collection of the United States National Museum. Photograph by the author, somewhat reduced.

them. Then, it is a well known fact that in sound trees, occasionally in dead ones, woodpeckers excavate deep, cylindrical cavities with circular entrances, at the bottom of which their eggs are laid, and which subsequently shelter their featherless young. For this purpose the trunk of the tree is sometimes selected; while in not a few instances, one of the larger branches seem to suit the bird better. It is on record that woodpeckers have occasionally made their nests in other ways and in other places; for instance, flickers have been known to hollow out a nest on the ground, or to occupy a box fitted up for them.

Birds of other groups have nesting habits similar to those of our woodpeckers; but in no family are these habits so general for all the species. The reader may readily find examples of this sort in any good work on American birds, of which our natural history libraries possess a generous supply.

In the matter of bodily structure, woodpeckers offer us some remarkably interesting characters, and these, as in all living creatures, pertain to the needs and habits of the forms possessing them. Some of the larger species have beaks that are veritable chisels, being strong and stout, with distal end well adapted for cutting into wood or other substances of a like density. Such bills are best seen in our big Ivory-bill Woodpecker or in the Pileated Woodpecker; while in the smaller forms, as in the Downy and the like, the beak may be weaker, but still fully meeting the demands of the bird possessing it.

The skull is strong and of a characteristic type; while the tongue, in the majority of species, is of a unique sort. In order to quickly secure many of the insects that the bird discovers through persistent search and bill-rapping, instant and unusual protrusion is called for. This is effected in two somewhat similar ways, both of which are shown in Fig. 7. Various, very slender bones constitute the framework of all birds'

SMALLER BLACK AND WHITE WOODPECKER

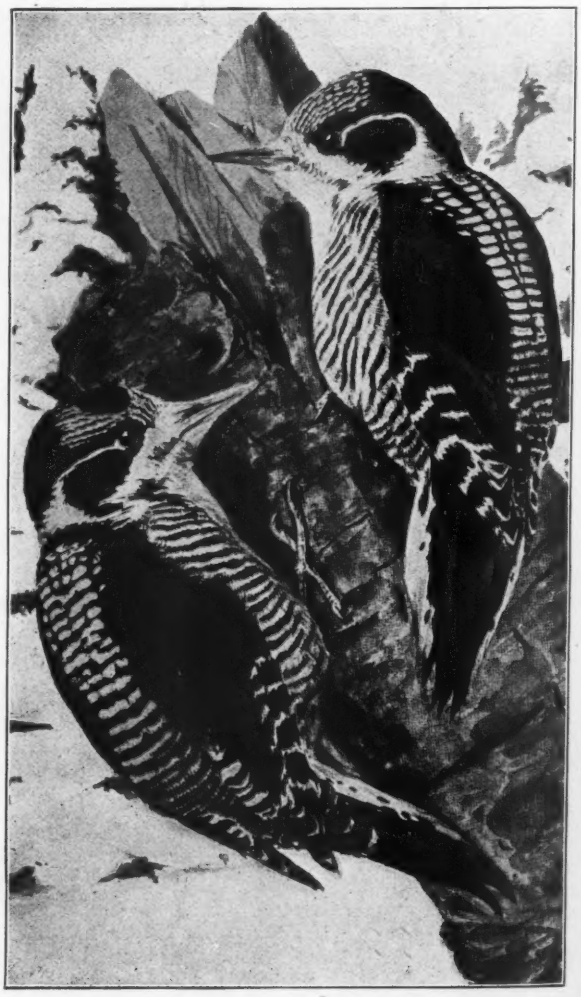
Fig. 3. A familiar species is the Downy Woodpecker of the East (*Dryobates p. pubescens*), and the specimen here shown was photographed from life by the author. The adult male bird has a scarlet crescent on the back of its head.

THE WHITE-HEADED WOODPECKER

Fig. 4. Confined to the Pacific Coast region and westward to Nevada, this Woodpecker (*Xenopicus albolarvatus*) is a singularly conspicuous bird. This male specimen is reproduced from a water-color by the author (nat. size). (Henshaw, coll., Kernville, California, October, 1875.)

tongues, and this is especially required in the case of woodpeckers. In front, the tongue has a single, median bone; but further back it presents two branches, also containing very slender bones, as shown in the cut. The whole is under the control of a series of muscles, delicate in form and structure, which regulate its protrusion and retraction when not in use. In some species (*Picus*) the innner, free extremities curve around the right orbit as a place to harbor these muscles when not being protruded; in other species, as in our Golden-winged Woodpecker, these ends run forwards in a groove on the top of the cranium, to be stowed away in the right nostril. Quite a chapter would be required to fully describe all that pertains to the anatomy and physiology of this most remarkable contrivance, for which space is not available in the present connection.

The skeleton and muscular structure of the neck of a woodpecker is very strong—indeed, the entire anatomy of the bigger species is by no means lacking in such matters. Further, their clinging to the trunks and limbs of trees demands other modifications in their build, and we find it exemplified principally in the tail and feet of the majority of the species. With but few exceptions, the feathers in the tail are unusually stiff and strong, with distally pointed ends. This arrangement allows the bird to sustain its most unusual position, or its various attitudes when alighting on or ascending the more or less vertical trunks and limbs of trees. Then, too, the feet are structurally different from the vast majority of perching and other birds; for they have, as a rule, two strong toes in front and two behind—the exception being two in front and only one behind, as in our three-toed woodpeckers. This arrangement assures the best of seizing and holding-on capacities so essential to a woodpecker's peculiar requirements. Again, the entire muscular system of an average woodpecker makes for the best carry-out of its particular needs, and the study of the anatomy of these birds is a chapter of great interest, one to which I have contributed not a few pages and plates. Several of the characters referred to in the foregoing paragraph are exemplified in the figures of



AMERICAN THREE-TOED WOODPECKER

Fig 5. Differing from other forms of the family, the American Three-toed Woodpecker (*Picoides a. americanus*) has, as its name indicates, but three toes instead of four upon either foot. Photographically copied by the author from a plate by Mr. Fuertes.

the present article, and particularly the various forms of beaks, tails, and feet.

An authority at hand truly remarks that "with the possible exception of the Crow, no birds have been subjected to so much criticism as the Woodpeckers. When they are seen scrambling over fruit trees and their holes are found in the bark, it is concluded that they must be doing harm. The Woodpeckers, except a few species, rarely disfigure a healthy tree. But when they find a tree infested by wood-boring larvae, they locate the insects accurately, draw them out and devour them. If, in the years that follow, the borings formerly occupied by these insects are used by a colony of ants, they in their turn are dug out and destroyed."

All the year round — spring, summer, autumn and winter — woodpeckers are thus doing the farmer an incalculable service, not to mention the thousands of barrels of insects, pupae, grubs, and the rest that they utterly destroy, in the way of food, these preying upon the best class of trees that constitute our forests from one end of the country to the other — from east to west and from north to south.

Owing to the fact that the food of these birds may be obtained by them at all seasons of the year, the severest winters notwithstanding, woodpeckers are less inclined to be migratory as compared with the regular migrants, and their insect-destroying propensities are rendered all the more extensive and valuable.

All of our woodpeckers lay pure white, glossy eggs ranging from three or four to as many as eight in number, no attempt being made to construct a nest. At the best they allow a handful or so of the chips they make in excavating the nesting cavity in the selected tree to remain in the bottom, and upon these the clutch rests during the period of incubation. No particular species of tree seems to be preferred by any of the various kinds of woodpeckers for a future home; and if for any reason trees are undesirable or scarce, as in burnt-over districts for instance, some of the birds of this family, as the Golden-winged Woodpecker, will, without hesitation, burrow into some convenient bank, and use the further end of the excavation as a safe place to rear its young.

Through their flight, most woodpeckers can be recognized at a distance as being birds of that family; for the majority of them progress flying in an undulatory line, much after the fashion of our familiar little goldfinch. This mode of flight is well seen in all of the black and white woodpeckers, and still better in the flicker, as that species is so often observed at long distances from the forests.

THE SAPSUCKERS

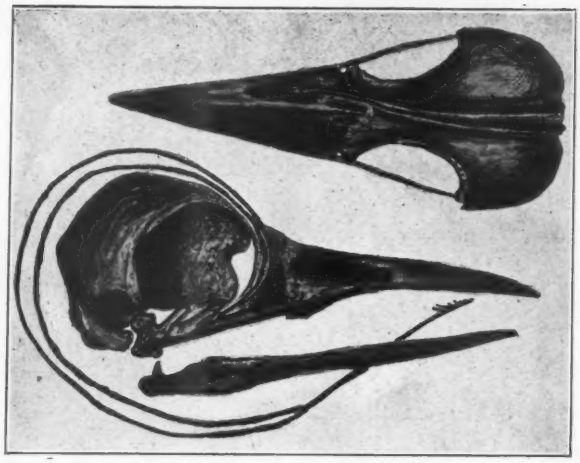
Fig. 6. A specimen of Williamson's Sapsucker (*Sphyrapicus thyroideus*) in the exhibition series of the United States National Museum. Photographed by the author, with tree-trunk substituted for museum stand. Courtesy of the Museum.

Of all the woodpeckers of the bird fauna of this country, no species can in any way compare with the Ivory-bill; it outclasses each and all of them in size, beauty, and economic importance, in so far as its habits affect man's interests. (Fig. 1.) It is a bird of great natural vigor, and has a length of some twenty-one inches or slightly more. Either sex has a glossy, blue-black plumage, only the male possessing a conspicuous scarlet crest faced in front with black. A zig-zag white stripe, pointed at either end, runs from just below the eye, on either side, to the middle of the back between the shoulders. The feathers of the distal parts of the wings are also white, while its powerful, chisel-like bill is of an ivory tint, as the common name of the bird implies. Unfortunately, though apparently not especially through man's agency, the species is for some reason gradually disappearing, and is, at this writing, to be met with, with any certainty, only in the trackless cypress forests and swamps of the southeastern parts of the United States, from southeastern North Carolina, westward to Texas, in the kind of country it prefers in the area thus included. Most frequently it is found in certain parts of Florida. Per-

sonally, I have met with this bird only once on its range, and that was in southern Alabama many years ago. I failed to collect it as it flew too high above me to be brought down by the simultaneous shots I fired at it of No. 13's from a double-barreled shotgun. Several years later I had the satisfaction of publishing a full illustrated account of its skeleton, to the best of my recollection using a specimen collected by Chapman in Florida.

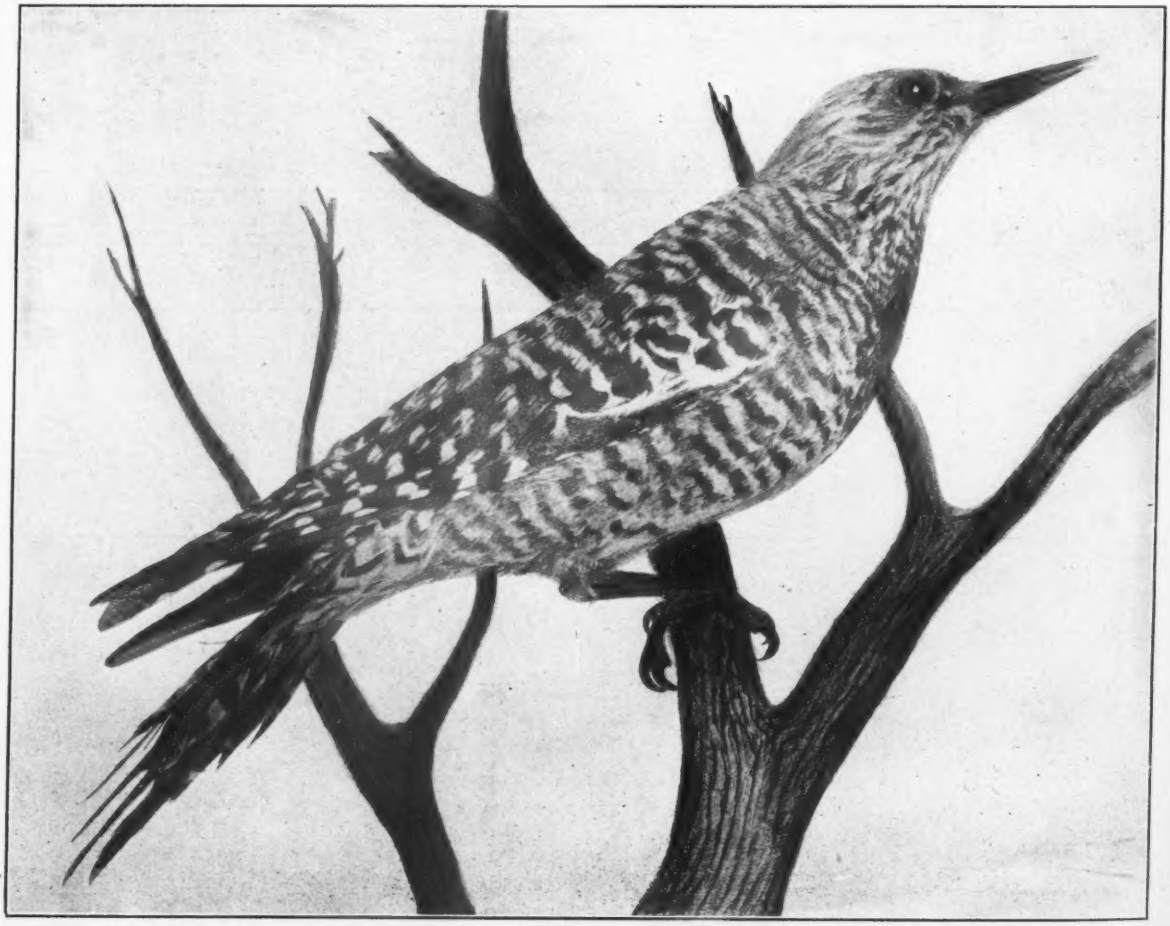
Ivory-bills usually nest high up in cypress trees, making a deep excavation with an oval entrance, and its clutch of eggs rarely exceeds five in number.

The constant loud calls and noisy notes made by this grand bird may be heard at long distances as they resound through the dense cypress swamps, where it resides in comparative safety. It is one of the most useful of all the woodpeckers, in so far as it destroys millions of grubs and borers that infest the trees of the forests throughout its range. And why the species is becoming scarcer and scarcer every year is hard to tell, as they are seldom shot by gunners, for they keep well out of the way of all the usual bird destroyers. It is a great pity, for it is one of the most magnificent inhabitants of the great forest areas of the Southern states, and the bird lovers of that



WOODPECKERS' TONGUES

Fig. 7. Upper figure represents the superior view of the skull of our Golden-winged Woodpecker, in which species the tongue passes forwards in a median groove on the surface of the cranium, to enter the right nostril and extends forwards to end of bill. In still anotner genera (*Picus*, lower figure) the tongue curves around the top of the skull and surrounds the orbit in front, as shown. Only the bones are represented here, the muscles and other structures having been removed. Partly diagrammatic, and drawn by the author from specimens in his own collection.



WILLIAMSON'S SAPSUCKER

Fig. 8. This curious species occurs in the forest districts of the mountains of western North America and southern British Columbia. Southward, it extends to New Mexico, southern Arizona, and California. During the winter months it may be found in the timbered districts of Mexico, western Texas, and lower California. Photographed by the author. Courtesy of the United States National Museum.

THE PILEATED WOODPECKER

Fig. 9. An adult male of this species has a length of nearly twenty inches, and is a wonderfully handsome bird with its black and white plumage and brilliant crest of red. Photograph by the author. Courtesy of the United States National Museum.

region are not few by any means. It has but one rival in our avifauna, namely the Pileated Woodpecker—a much smaller species and not so brilliantly plumaged, which will be described further along.

Audubon gives us a very unusual account of the Ivory-bill, stating that it "confines its rambles to a comparatively small portion of the United States, it never having been observed in the Middle States within the memory of any person now living there." Yet he tells us in the next paragraph that "the species may be accidentally seen in Maryland," and that it occurs all over the South, westward to Texas, and northward to the Ohio River!

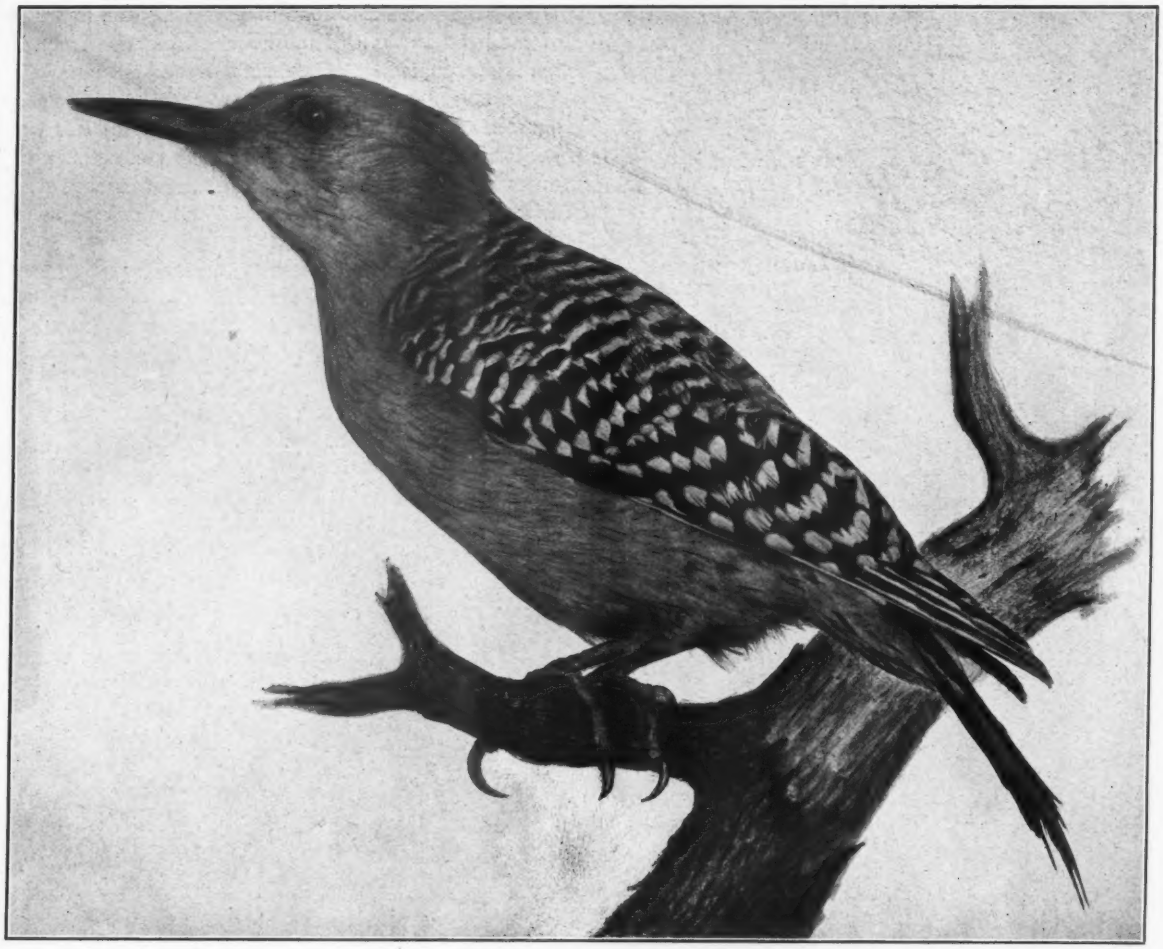
He apparently gives us at least one excellent reason for its gradual disappearance when he says: "Travelers of all nations are also fond of possessing the upper part of the head and bill of the male, and I have frequently remarked, that on a steamboat's reaching what we call a wooding-place, the strangers were very apt to pay a quarter of a dollar for two or three heads of this woodpecker. I have seen entire belts of Indian chiefs closely ornamented with the tufts and bills of this species, and have observed that a great value is frequently put upon them."

Wilson, who gave us some very amusing accounts of his experiences with a captive Ivory-bill he once had, emphatically states that the species is a most powerful protector of our forests, in that it consumes as food no end of destructive insects and their larvae.

From the famous Ivory-bill we pass to rather a long list of woodpeckers that exhibit certain patterns of black and white in their plumages, while the males may have a patch or small patches of bright red at the back of the head. The black and white is generously arranged in longitudinal bars on the head with transverse ones on the wings, while the lower parts are entirely white, with the upper one centrally white and black on either side.

THE RED-HEADED WOODPECKER

Fig 10. The one here shown is a full-plumaged male, and was photographed from life, natural size, by the author. The young have a plumage entirely different from their parents, the latter being very conspicuously marked, as set forth in the article.



THE RED-BELLIED WOODPECKER

Fig. 11. In certain localities Red-bellied Woodpeckers occur throughout the United States, ranging into central Texas. The specimen here shown is in the exhibition series of the United States National Museum. Photographed by the author. Male, in full plumage.

The Hairy Woodpecker and its near congeners, as well as the species and subspecies of the Downy Woodpeckers possess plumage patterns after this order, with several distinct variations. Audubon got the black and white series of woodpeckers all mixed up, while Wilson appeared to have known only the Downy and the Hairy—indeed, the latter author described but ten species of woodpeckers for the United States, and these included only the most abundant forms. Audubon remarks that "Wilson, it appears, did not believe in the existence of the Canada Woodpecker (*Picus canadensis*); yet his figure of the Hairy Woodpecker seems to me to be a representation of that species, while his description belongs in part to both," Audubon figured the "Canadian Woodpecker," and yet we have no bird bearing that vernacular name in our official list of woodpeckers. Quite possibly it was the bird now called the Northern Hairy Woodpecker (*D. villosus leucomelas*); but to untangle all such questions in a list of birds now numbering over forty forms would be quite out of place in the present connection. However, for the benefit of those commencing the study of these birds of our avifauna, it may be as well to state that such species of Audubon describes and figures as the "Canadian Woodpecker," Phillips' Woodpecker ("Massachusetts. Very rare."); Maria's Woodpecker; Redbreasted Woodpecker; Banded Three-toed Woodpecker, and so on, do not occur in our official list.

Every species of our Hairy and Downy woodpeckers are useful in destroying a great number of different kinds of parasitic insects, their larvae, and grubs, infesting every variety of forest tree, as well as those of our orchards and gardens. These birds should be protected and encouraged at all times, and teachers of American ornithology should make every effort to instruct our school children in the matter of recognizing them in the woods and fields, to the end that they may not be targets for the merciless air gun or the more effective weapons of the boy scouts. Good figures of these black and white woodpeckers are here given in Figures 2 and 3.

Our Red-cockaded Woodpecker is a blacker bird than either the Hairy or Downy, and about between the

two in the matter of size. The male has a fine scarlet stripe over either eye, and this character serves well for identification. Sometimes, in the forests, it is mistaken for the Downy; but a good student of birds is not likely to confuse the two.

T. Gilbert Pearson has given us a most interesting account of this species, and he says among other things: "And now comes the most curious habit of this interesting bird. Before a single egg is laid each spring the birds peck hundreds of small holes through the bark about the nest from which the turpentine begins to flow. This soon makes a shiny, sticky surface all around the tree for two or three feet above the nest and for several feet below it. Why this is done we can only conjecture, although the birds doubtless have a very good reason. It is certainly true that none of the ants that sometimes attack young birds could crawl across this no-man's-land, and it is equally true that the nest will not be troubled by the flying squirrels that are everywhere abundant in the pine forests of the South."

YOUNG FLICKERS

Fig. 12. We have here a most remarkable photograph made by the author, of a Golden-winged Woodpecker's nest containing newly hatched young. A full description of it occurs in the text of the article.

Equally interesting species are the Texas Woodpecker, the San Lucas and Nuttall's, and the Arizona Woodpecker, but space will not admit of my referring to their histories here. Apart from the Ivory-bill, all the species thus far mentioned belong to the genus *Dryobates*—a word from the Greek meaning "treaders of oaks," which, to an extent, is true, as all these birds prefer the oaks to the exclusion of the pine trees—a very interesting fact. No fewer than nineteen different kinds of woodpeckers in our country have been referred to the above genus; and between it and *Picoides* (created to contain the Three-toed woodpeckers) we have a very curious type of this family, namely the White-headed Woodpecker, *Xenopicus albolarvatus*, a bird of the forests of the Northwest, from southern British Columbia to southern California, east to Idaho and Nevada (Fig. 4). This bird has a most striking plumage, as the head and foreneck are pure white, the male only having the back of the head and nape a rich red. All the rest of the plumage is of a shiny black, the only exception being the large feathers of the wings, which for the most part are white. They live principally upon ants and the seeds of the pines in about equal parts. It is said that the female may lay as many as seven eggs, the hole of the nest rarely being more than fifteen feet above the ground and cut in a pine or fir tree. The late Dr. J. C. Merrill, of the Medical Corps of the United States Army, left us an interesting account of its habits as he observed them at the time he was stationed at Fort Klamath. Among other things he tells us that "on most of the pines in his vicinity there are many short stubs of small broken branches, projecting an inch or two from the main trunk. When the sun is shining, these projections are lighted up in such a manner as to appear quite white at a little distance, and they often cast a shadow resembling the black body of the bird. In winter when a little snow is lodged on these stubs, the resemblance is even greater, and almost daily I was misled by this deceptive appearance, either mistaking a stub for a bird or the reverse."

For two years I made continuous efforts to obtain a skeleton of the bird just referred to, in that I might describe its osteology; and when one was finally sent me for that purpose, I was enabled to include it in my work upon that subject.

We have some four species of Three-toed woodpeckers, and they are chiefly northern birds with interesting habits. Mr. Fuertes has given us a good representation of the American Three-toed species, and this I have reproduced in Figure 5, though not as large as the original. The male is the lower bird, and the top of its head is a rich yellow, while for the rest the plumage is black and white as indicated. To some, these birds are known as "ladder-backs" from the transverse black and white bars of that part of their plumage. As a rule our Three-toed woodpeckers do not migrate, but remain in their habitats throughout the bitter northern winters, living upon hibernating insects and grubs beneath the bark of various trees. They are very silent birds, and the hunter often passes one without noticing it.

Fuertes, who stands, in my estimation, far and away of Audubon as a painter of woodpeckers, not to mention a few other birds, has given us some wonderful portraits of them, and his plate portraying the Red-headed Woodpecker (adult and immature) with a pair of yellow-bellied Sapsuckers is certainly a picture of great beauty and very true to life. I once had alive a specimen of the first-named bird, and I succeeded in obtaining a fine photograph of it which is here seen in Figure 10. It is one of the handsomest birds of our country, with its brilliant crimson head and black and white plumage, as shown in the figure. Immature birds, which I have likewise photographed, are entirely different in plumage as compared with the adult ones, the upper parts, including the head, being brownish, streaked with darker tints, the body being otherwise marked with black, gray, and so on.

Preceding the Red-head in our official list of birds, we have five different kinds of woodpeckers known as Sapsuckers (Fig. 6) and the Pileated Woodpecker with the northern species of it (Fig. 9). The former are birds with wonderfully beautiful plumage — black, white, crimson, red, yellow, and other colors, arranged in most attractive patterns. Space will not admit of my describing any of these in detail; and to appreciate their beauty the various species must be seen and compared. Their habits are extremely interesting and good accounts of them have been given us by a number of our descriptive ornithologists. These birds puncture various trees and lap up the exuding sap with their brush-like, short tongues; and to this extent they are often a harmful factor in our forests, inflicting serious damage to the timber in the Southern States. However, this is offset by the good they do in insect destruction.

GOLDEN-WINGED WOODPECKER

Fig. 13. Young male Flicker shortly after leaving the nest. Photographed from life by the author. Note the black band extending down from the bill. This is red in certain western species, and entirely wanting in the females of the various forms of the genus. A species widely known throughout the country.

In the same genus with our Red-headed Woodpecker we have the Ant-eating, the California, and the Narrow-fronted woodpeckers. Then, in the next genus there is that splendid species, Lewis' Woodpecker—a bird that I had abundant opportunity to study, many years ago, in the Big Horn Mountains, as well as in the scantier timber that lined the streams in central Wyoming. There is so much black in the plumage of one of them that many know the bird as the "Black Woodpecker" or the "Crow Woodpecker." It is of a rich red and gray beneath, and an adult specimen has a length of somewhat exceeding ten inches. It has some very unusual habits, such as leaving its perch (upon which it sits cross-wise like a robin) and flying out like a flycatcher after insects. It also resorts to the ground to capture ants and various other insects upon which it feeds. It breeds in cavities prepared by other birds; and at certain times the species is gregarious, during which they are noisy. Being so many in one flock, they can be heard for some distance. As a matter of fact, considerable space would be required to give an adequate history of this remarkable bird.

Three handsome woodpeckers, namely the Red-bellied, the Golden-fronted, and the Gila Woodpecker, form the genus *Centurus*, the first being an eastern species well known to our student of birds (Fig. 11). The other two are western forms, or, in the case of the Golden-fronted, southwestern, as its range is in Texas south in to the Valley of Mexico.

Next in size to the magnificent Ivory-bill, we have, throughout eastern United States, another big, black woodpecker, the w i de l y known Pileated, which may attain a length of nearly twenty inches (Fig. 9). It is said that it requires as much as a month for a pair of these birds to excavate their nest in a solid tree, the excavation often going to the depth of more than a yard. A writer at hand says that "the food of the Pileated Woodpecker does not interest the farmer or horticulturist, for it is obtained entirely from the forest. The bird does not visit the orchard or the grain field, but all of its work in the forest helps to conserve timber. Its animal food consists probably of beetles and ants and its vegetable food of wild fruits."

Finally, the list of United States woodpeckers is completed by three species and three subspecies of birds generally known by the name of Flickers, although

they have a great many vernacular ones applied to them. As a group, they constitute the genus *Colaptes*, our common Flicker of the East, widely known as the Golden-winged Woodpecker, being *C. a. auratus* (Figs. 12 and 13). This bird has had many historians since the first days of the Republic.

Flickers consume no end of insect pests, a few ground beetles, and a very small amount of grain and fruit; so that, as far as man is concerned, the bird is a friend, and should be protected to the limit. It has but one unfortunate trait—in common with other species—namely, that of sowing poison ivy seeds broadcast. This is a trick we have no means at our command to break him of—at least none has thus far been proposed. This bird has a bill quite different from the average woodpecker, being rounded and somewhat curved downwards.

In cities the Flicker seems to have no dread of man; and last summer I passed within a yard of a fine male on the Smithsonian grounds, it being engaged at the time in pulling out some worm or other hidden in the sod. The bird looked at me inquisitively once or twice, but kept steadily at the task upon which it was so busily engaged.

One of the most absurd accounts of this bird was left us by the Count de Buffon, and one of the best accounts by Wilson—the latter, by the way, well raps the Count for his untruthful history of the species. But this is a side of ornithological literature which, though intensely instructive, can in no way be entered upon in the present article. On the other hand, perhaps enough has been set forth to convince those who may previously have had their doubts, that, taken as a family, the woodpeckers are among the best of our bird friends, in so far as forest protection goes—and that is a very important item.

International Newsreel Photo.

FORESTRY STUDENTS PLANT TREES

Students of the New York State School of Forestry are pictured here planting trees on abandoned farm lands. Young forest trees have been used to aid in the national plan of reforestation, as in the entire country there is a total of 85,000,000 acres that will undergo this natural treatment. The economic welfare of the nation depends a great deal upon the forests, and the United States Forest Service has been instrumental in urging and aiding in reforestation in many parts of the country.

"CUT CLEAN AND KEEP OUT FIRE"

By R. S. Kellogg

IN a nutshell, this sums up the opinion of many foresters in New York State as to the least expensive and most practical means of securing continuous production of a forest crop of value in the Adirondack region.

This does not mean that leaving nature to take her course after cutting will bring back a new stand of the same kind of timber as the old one, nor that intensive silviculture will not produce a more valuable crop than

NATURAL GROWTH OF HARDWOOD SAPLINGS FOLLOWING CLEAN CUTTING AND PROTECTION FROM FIRE

no silviculture at all, but forestry must pay its way and methods must be used whose cost will not be prohibitive when carried over the period of timber growth.

The clean cutting of spruce or of mixed spruce and hardwood may be followed by a forest consisting entirely of poplar, birch, maple and other hardwoods, but who can say that such a forest fifty years hence may not be as valuable as one of spruce? It does not require a long memory to recall that forests in the Adirondacks were originally cut over for pine, then for pulpwood, next for hardwoods with oftentimes a large amount of cordwood still left after the last cutting, and that in each successive cutting the value per acre was greater than in the preceding one despite the elimination of what was previously considered the only valuable species.

Considerations such as these were the subject of lively discussion and interested observation at the recent meeting of the New York Section of the Society of American Foresters, near Tupper Lake, participated in by representatives of the forest schools, foresters of the Conservation Commission and foresters in a wide variety of private undertakings. It was a meeting in the woods and about the woods and a nearby lumber operation which exhibited all the stages of cutting and growth from pine to cordwood was a most instructive example of the methods used by nature in restoring and maintaining a forest when unhampered by fire.

On the site of the first photograph, for instance, the timber was cut entirely clean 28 years ago for camp wood over a considerable area. Today there is on this same ground a beautiful young stand of yellow birch, maple and other hardwood saplings, straight, tall and in good density. In fact, measurements made in 1920 by Professor Recknagel, of the Cornell Department of Forestry, showed at that time a stand of 22½ cords per acre, a growth of nearly nine-tenths cord per acre per year of wood fibre, produced entirely through the unaided efforts of nature to maintain the forest.

The second photograph shows a cutting made two years ago within a short distance of the first for the purpose of hardwood lumber, there being left behind trees too small or too defective to utilize profitably There are now coming up on the ground a large number of hardwood seedlings, which if fire does not get in, will ultimately result in a forest of very uneven age and one containing many older trees, which in addition to being of little value themselves will have been a

CONDITION OF THE FOREST TWO YEARS AFTER THE USUAL HARDWOOD CUTTING

hindrance to the growth of the more even aged younger stand. Obviously, had this stand been cut clean as in the first photograph, the succeeding forest would have been more valuable than the one that will now follow. However, the cutting was determined by the rules of practical utilization which forbid the taking out of any tree that will not pay its way. Had there been a market for the remaining firewood, a better forest would have been secured than the one which will now result.

By the way of contrast with these examples of natural reforestation, a snapshot is shown taken in the noted

coniferous plantation at Axton, established by Dr. Fernow twenty years ago on land which was old pasture at that time. This land is now covered with a thrifty growth of Scotch and white pine, Norway spruce and

NEW YORK FORESTERS VISIT THE CONIFEROUS PLANTATION MADE AT AXTON IN 1902 BY DR. FERNOW

European larch. The larger specimens run up to 8 in. in diameter and 25 ft. in height. It will be interesting to note which will give the greater return upon the investment twenty-five to fifty years hence, taking all costs into consideration and subjecting them to the rigid formulae of compound interest — the even-aged stand of hardwood reproduced by nature after clean cutting or the coniferous forest planted by man upon clean soil?

The New York Conservation Commission is also doing a splendid work in making the Forest Preserve usable through the construction of typical Adirondack camps with concrete fireplaces for cooking.

Forestry Meeting in South Carolina

Upon invitation from the Governor of South Carolina, a number of representative citizens of that State met at the Capitol to discuss the forestry needs of the State. Representatives from the Forest Service attended the meeting and explained the character and extent of co-operation, particularly that in forest fire protection, which the Federal Government could offer. The concrete result of the meeting was the passage of a resolution recommending that the Governor appoint a forestry committee to prepare a bill for introduction in the coming session of the legislature, which would provide primarily for a State forestry organization, State Forester, fire protective system, and funds to carry on the work.

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CANADIAN DEPARTMENT

By ELLWOOD WILSON

Last year was a very bad year for forest fires and the early part of this season also, and after a strenuous time of fire-fighting, everyone was breathing a sigh of relief that the fall had come and all our troubles were over. After an exceedingly cold spell, the weather became very warm and dry and no rain fell. Day by day passed and the woods grew dryer and ryer, the brooks dried up and the water in the rivers and lakes got very low. Suddenly fires began to spring up as if by magic, especially in the neighborhood of towns and villages. Hunters were going out after partridges, the weather was so fine that people were going off for picnics in their cars and everything in the way of slash and stumps was so dry that it seemed an ideal time for the farmer to clean up his land. Then high winds came and the fires began to spread. Then forest fires began to break out and we woke one morning to hear of the terrible disasters in Northern Ontario where whole towns and villages have been burnt up and many lives lost. Then rain came and every one breathed more freely only to hear that the fire fiend had visited northern Quebec and burnt two towns, but without any loss of life. The destruction has been appalling, in Ontario 48 lives and eight million dollars worth of property, not counting timber destroyed. Haileybury, a town of 3000 inhabitants was wiped out, also Cobalt and several other towns, 700 square miles in all. In northwestern Quebec the towns of North Temiskaming and Nedelec were destroyed. Fires in the St. Maurice Valley and at Lac Frontier also took their toll of timber. Whole families have been destroyed, one family was found suffocated in a root cellar and from the attitude in which the bodies were found it was evident that they had given up hope, had taken leave of eachc other and resigned themselves to die.

The whole thing is heartrendingly pathetic and so unnecessary that one could weep in impotent rage over the situation. Every fire (except those caused by lightning, less than a fraction of one per cent) is set by a human being, is actually lighted by a match, a cigarette butt, ashes from a pipe, a neglected camp fire or a spark from a railway train or steamboat. No fire ever starts from spontaneous combustion. Therefore every person who lives near or who has occasion to go into the woods must be educated to be careful and to have a sense of responsibility. At least a dozen times during the past summer I have seen fires started along the highways by people driving by in motor or other vehicles. Probably the greatest menace is the cigarette, because so many are smoked and there is danger from the match used in lighting them and in the butt which is always thrown away.

Fires occur every year, every so often we have a dry season when holocausts occur, like the Mirimichi fire, the Cobalt fire, the Cloquette fire and now the Haileybury fire. Why as intelligent beings shoulld we not learn from the experience of the past? Why do we let such a situation continue. I have never found a man who was willing to admit that a forest fire was a good thing, but I have met men who pass for intelligent men of common sense who say that we will always have bad fires. The Manager of the Woods Department of a large company years ago told me that God sent the fires just as he sent the rain. Only last week the woods superintendent of an operation told me that there was no use in putting out a fire because it would only burn again next year. A man whose job is to extinguish fires said that once a fire was started nothing but prolonged rain would put it out. Others say you cannot stop smoking in the woods. Price Brothers and Company stopped their men from smoking except in camp by taking away their matches and by a heavy fine or imprisonment for smoking. Another difficulty is the attitude of some of the magistrates who will not fine a man for setting fires or will let him off with a fine of a few dollars. A settler, this summer, applied for a permit to burn a few acres of poor land and was refused. He set his fire in spite of this and burned up 150 square miles of timber land.

Fires have been set by gangs operating in the woods and no action taken in the way of dismissal, fine or reprimand.

The whole trouble is lack of appreciation of the desperate situation. We cannot afford to have the timber burnt up. Wood is of such basic importance that our forests must be saved from fire. The public must be made to realize the situation, they must understand that it is just as bad to burn young timber as it is to burn trees which are already merchantable. When the latter is burnt the loss is heavy right at the moment, but without the young growth there will be no future forest. Then too, in a country like Quebec and northern Ontario, the country is absolutely unfitted for anything else but the growing of timber, except in relatively small areas. One forest fire sometimes burns away all the soil and two or three invariably do so. I traveled through a section this summer, where ten years ago there was virgin timber. Today, after repeated fires, the tops of the hills are burnt down to the rock and wide stretches of country are so burned that for over a hundred years there will be no timber of any sort or kind.

What can be done about it all? What practical means can be taken to stop this terrible devastation, which if continued will wipe out our wood-using industries and leave us a desert? Can we not learn the lesson from the fate of China, North Africa, Spain and Persia? Are we so blind to our own interests, to our responsibilities, so silly that we are going to let this thing continue? Canada has good fire laws and the governments have ample authority and can have ample means to stop fires. The lands belong in most part to the governments and they have absolute control of them. There is no escape from the responsibility, no excuse for not having proper fire prevention. It requires intelligence and firmness. Children in the schools must be taught that a forest fire is *worse than the fear of hell.* Railroads must be forced to take adequate prevention measures. Settlers must be watched during all dangerous periods. Men working in the woods must be absolutely prevented from smoking. Hunters and fishermen and campers must be careful or must be barred from the woods. As far as lumber and paper companies are concerned, the responsibility for fires set by their own employes is squarely up the the managers. If the men working in the woods *know* that the company will not stand for fires, that if they are careless or set a fire it is cause for immediate dismissal and prosecution they will at once become interested and careful. If in a district a man who sets a forest fire is blacklisted others will soon stop being careless. I have seen a case where the manager of a company was very anxious not to have fires, but his woods superintendent held the opinion that men could not be prevented from smoking and that fires were bound to occur, so his chief's efforts were completely nullified.

It seems to me that the danger has become so great that about the only means for checking fires is to have a force of fire rangers who at the same time have police powers and can arrest and bring out any man caught contravening the law, either in or out of the forest. Magistrates must then be educated up to the point where they will consider setting a forest fire or burning slash without a permit in the same category as arson. In-

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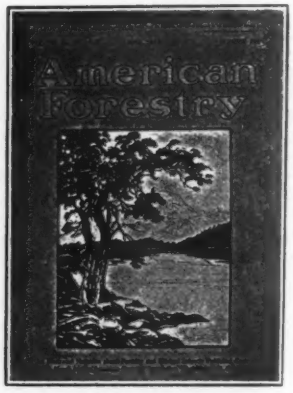

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cendiarism should be punished with a long term in prison. Every effort through the churches, the schools, forestry associations and the like, must be made to develop a public sentiment which will demand that no fires be set.

No one seems to realize the terrible inroads made by fire on the forest wealth of eastern Canada. It appears only in all its appalling significance when one flys over the country in an airplane and sees the burns stretching for miles and miles. When one sees, in this way too, the relatively small areas of softwood timber the outlook for the future is pretty gloomy.

The government of Ontario through its Forestry Department has made excellent progress with its aerial reconnaissance of the country north to Moose Factory and Fort Albany on James Bay. Three hundred and fifty hours have been spent in the air sketching in types of timber and making eye estimates. A few pictures have been taken. Due to lack of maps some system of control for sketching operations and aerial photography has to be worked out. The country is not very well watered with lakes and most of the timber is in the river valleys. The timber is mostly black spruce and white birch and there are very large muskeg or swamp areas. This is the most extensive use of the airplane for forestry work and the flying has been carried out by the Laurentide Air Service, Ltd., with signal success.

The Barnjum prize for the best essay on the control of the spruce bud worm has been awarded to Mr. Otto Schierbeck of Price Bros. and Company, Ltd. The essay was excellent and showed hard and careful work. Owing to the fact that all of the information in regard to the bud worm had been collected and published by the entomologists of the Dominion Entomological Branch, the judges decided to divide the prize of $5,000 between the successful essayist and the entomologists.

The Province of Nova Scotia has made a notable stride and has withdrawn from settlement all forest land. This is what should be done everywhere and is a vital step in the whole program of conservation, because when land which is only good for forests is thrown open for settlement the forest is destroyed and the settler has no opportunity to make a decent living on such poor soil and sooner or later moves off leaving a burnt forest and a few abandoned shacks as the result of years of grinding toil,

The Institute of Industrial and Domestic Arts, Gardenvale, Quebec, now conducts correspondence courses in pulp and paper making and expects soon to have a course in elementary forestry for woods and fire rangers, inspectors and scalers.

FOREST POLICY REPORT

The Chamber of Commerce of the United States issues the following statement with regard to the work of its Committee on Forestry Policy:

"The report of the committee has been received by the Board of Directors of the Chamber, but as yet no action has been taken. Postponement of action until the November meeting of the Board will afford an opportunity for any members of the committee who may not agree with the report, to submit minority reports.

"Pending consideration of the report by the Board in November, the report is not being released for publication. Under the Chamber's procedure a committee report is released only when sent out for referendum vote."

HOW TO INTEREST THE PUBLIC IN FORESTRY

The following extract from the *Outlook* may be of interest on the question as to whether the organ of the American Forestry Association should be edited from a purely technical standpoint, or so as to appeal also to the non-technical public.

The Outlook, September 20

John Morley, when editor of the *Pall Mall Gazette* had for an assistant another distinguished journalist, W. T. Stead. Morley, according to a recently published book had the scholar's predilection for experts, while Stead questioned their availability in journalism. "Suppose you had to have an article on sun-spots," said Morley, "would you get an astronomer to write it who knows everything about

the subject, or a journalist who knows nothing?" "The journalist, most assuredly," Stead replied; "if you get an astronomer to write the article he will write it for astronomers and use terms which your readers will not understand. The net effect will be that your reader will not learn what you want him to." "But," queried Morley, "is that not setting ignorance to instruct ignorance?" "By no means. It is setting a man who is intelligent to tap the brains of a specialist and then to serve up his knowledge so that it can be understood by the ordinary reader." Apparently the debate ended here.

PERPETUAL TIMBER SUPPLY FOR LUMBERMEN

Sooner or later the timber accessible to a sawmill becomes exhausted, says the Forest Service, United States Department of Agriculture. The operators are forced to junk a large part of their equipment, tear up their railroad tracks, abandon their roads and move to other sources of supply. To the lumberman this means a loss of money and time; to the workers in mill and woods it means either seeking other employment or new fields of activity; to the community it means a serious and sometimes a fatal setback.

Relief from these conditions, forest experts state, marks a recently proposed sale of National Forest timber as the most unique offer ever made by the Government to lumbermen. The timber to be placed on the market is within the Malheur National Forest, Oregon, and the Government proposes to open up the region on the basis of a perpetual supply of forest products. Forest Service estimates show that 60 million feet of yellow pine saw timber may be cut yearly for all time, thus insuring to the local industries the opportunity to have a continuous stream of raw material, permanent bases of operation and staple employment for woods and mill workers.

The area which totals 550,000 acres and contains 6700 million board feet of saw timber is, according to foresters, one of the last great timbered regions in the United States to be opened up for industrial development.

The first unit to be put on the market is now being offered to the highest bidder and includes 890 million feet to be cut under a 20-year contract.

CAMPS IN STATE FORESTS

To encourage use of the recreational facilities of the State Forests, the Department of Forestry has authorized the construction of seven additional public camp grounds in Pennsylvania this fall. These new camp grounds, and the eleven similar recreational areas which were developed last spring, will provide headquarters for hunters who go into the woods this fall.

Several camp grounds will be equipped with log lean-tos, stone fireplaces, walled-up springs, garbage cans, comfort stations, and in some instances, public telephones. Use of the camp grounds will be free to the public, but permits, which will be issued by the local forest officers, will be required when campers desire to occupy a site for more than two days.

Three of the new camps will be equipped and situated particularly for the use of automobile tourists who carry camping outfits with them. These camp grounds, however, are not restricted to their use. They may be occupied also by sportsmen and picnickers. Four other new camp grounds will be prepared by the department for the convenience of sportsmen and campers.

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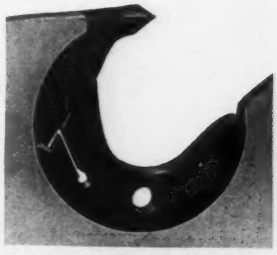

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THE RED SCOURGE

"On the tenth day of July a man set fire to more than a score of homes. Every home was entirely consumed and there was no insurance. The man went on his way, if not rejoicing, at least without visible evidence of regret. He had no fear of punishment because the homes he had destroyed were not yet built; they were still in the tree trunks awaiting the magic wand of industry to give them habitable form. But economically these homes were destroyed as surely as though the trees had been made into lumber and the lumber into structures. And this is the way it happened:

"It was the vacation season and an automobile carrying a party of tourists stopped on a road that wound through a magnificent stand of Douglas fir, in Western Washington. The travelers sat in rapturous admiration of the quiet forest scene and rhapsodized over the great trees that columned their majestic beauty as far as the eye could see. One of the men of the party lit a contemplative cigarette and tossed the match to the side of the road.

"Half an hour later an airplane forest patrol flying high above the mountain range saw a yellowish smoke ballooning over the tree tops. He moved his control and turned in that direction. Upon the chart in the machine before him he located the fire approximately, then returned quickly to a mountain fire station ten miles away. * * *

"After what seemed an interminable wait, the patrol noted various gangs of men at work. They were combating that most terrifying, most ungovernable and dangerous of all rebellious elements—the forest fire. For a day and night and another day the battle waged. Grimy men, black as the charred trunks around them, worn to the last stages of exhaustion, fought on—cutting away underbrush, dynamiting logs and trees, beating out the slinking fringes of advancing ground fire, shouting one to another above the crackling inferno of heat and smoke, panting like hunted animals around the water barrels where they slaked their thirst with the luke-warm liquid, but gaining, almost imperceptibly at first, yet gradually with greater certainty as the weary hours dragged on. And amid the confusion and crash of falling timber the ranger and foremen generalled the battle.

"Several days later a wide, barren scar lay upon the mountainside, still smouldering in places where the black splinters of the charred stumps pointed like accusing fingers, and still sent out masses of yellowish white smoke. The scar covered hundreds of acres and it would continue to smoulder and smoke for weeks, while all about in the adjacent woods were fire guards constantly vigilant to see that the enemy did not creep out and strike again.

"And far away the automobile tourists journeyed carefree and utterly unconcerned. At a sawmill they stopped for a few minutes to watch the logs in slow procession from the pond to the band saws. 'What a shame,' exclaimed the man with the cigarette, in a burst of sentimental revolt, 'What a shame to cut down those beautiful trees.'"

FOREST FIRE FIGHTING COMPANY

Through the effort of leading citizens, foresters and fire wardens, Mt. Carmel, Pennsylvania, now claims distinction for having in its midst a fully organized forest fire fighting company. The first so far as is known in the United States.

The company was organized to satisfy a pressing need for better forest fire protection in the vicinity of Mt. Carmel. This being realized by the progressive people of the town it only remained for a leader in the person of W. W. Smith, District Forest Warden of the Philadelphia and Reading Coal & Iron Company, to make effective the desire of the community for improved forest conditions.

The organization was effected by first securing contributions from individuals in the locality. This done a building of the bungalow type was planned and started on the mountain side south of and adjacent to Mt. Carmel. This building is now complete and is 20x20 feet in size with a porch on three sides. It overlooks the town of Mt. Carmel and the lands of the Lehigh Valley Coal Company, Madeira Hill & Company, Susquehanna Collieries Company and the Philadelphia & Reading Coal & Iron Company. The cost of building and improvements to date is about $2,000.

In addition to the building provided for the use of members it is planned to construct a swimming pool, tennis court and trap-shooting grounds. The primary purpose of the company is to "organize and keep in readiness an efficient corps of forest fire fighters and to further the work of forest fire prevention." To this end the State Forestry Department will supply all needed fire fighting tools, while the coal companies affected will provide additional equipment such as fire fighting pumps, uniforms, etc.

The actual fire fighting work will be done by active members, limited to 30 in number. These will be divided into three crews of ten men each.

The leadership will be vested in a Chief Forest Protector and three assistant Forest Protectors whose duties will be to organize and train for quick response to and prompt suppression of all forest fires in the vicinity.

It is the belief of many that this pioneer work in forest protection will grow and spread from a mere local movement for better forests to one that will rapidly include all towns in the anthracite region and eventually those in wooded regions throughout the state.

WOOD VS. THE COAL SHORTAGE

That the forest land of New York might produce sufficient wood to relieve a restriction in coal distribution is one of the possibilities in supplying substitutes for coal in case of a coal shortage.

Foresters at the New York State College of Forestry state that there are four million acres of woodlots on the farms in New York capable of producing vast quantities of fuel wood. Many farmers already obtain their own fuel from these forests and place considerable quantities on the market.

But in the event of high prices for coal, according to the forestry experts, a new demand for fire wood in rural communities, towns and villages of up-state cities would be developed.

A cord of hardwood is estimated to contain about as many heating units as a ton of coal. Wood-fuel, however, is neither plentiful nor cheap, because none of the twelve million acres of forest land of New York, excepting a few infinitesimal parcels, is under a working forest management and never has been and is largely non-productive on that account.

Owners everywhere are able to obtain high prices for wood. Twelve to fourteen dollars a cord was paid for fuel wood last year. If twenty-five per cent of the forest land of New York was producing a maximum yield of timber as it would under proper forest management, and as they are doing in Europe, New York would have an available supply at reasonable prices to home consumers, sufficient in quantity to materially relieve any temporary coal shortage.

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LAST year over 100,000 lives were saved with the aid of Tuberculosis Christmas Seals. Tuberculosis is being controlled. The death rate has been cut in half. If you and others join the fight, it can be stamped out.

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AMERICAN FORESTRY will print, free of charge in this column, advertisements of foresters wanting positions, or of persons having employment to offer foresters. This privilege is also extended to foresters, lumbermen and woodsmen who want positions, or to persons having employment to offer such foresters, lumbermen or woodsmen.

POSITIONS WANTED

GRADUATE FORESTER—Experienced; eight years state forest management, four years nursery, landscape and horticultural work, desires connection with firm or individual interested in forests or nurseries for commercial purposes. Address Box 4020, care AMERICAN FORESTRY MAGAZINE, Washington, D. C. (6-8-22)

POSITION WANTED BY A TECHNICALLY TRAINED FORESTER at present employed as forest manager on one of the biggest private estates in Pennsylvania; 35 years experience. Can furnish the best reference. Address Box 4030, AMERICAN FORESTRY MAGAZINE, Washington, D. C. (6-9-22)

FORESTER, University Graduate; 28 years of age; ex-service man; several years' experience in the paper industry as an executive, also sales experience, desires position. Best references. Address Box 4040, care AMERICAN FORESTRY, Washington, D. C. (7-9-22)

YOUNG MAN, 32 years old; married; graduate of Cornell University; B. S., 1914; M. F., 1915, with five years' experience in the United States Forest Service. Desires position as forester with a lumber company or private estate. The best of references. Address Box 4050, care AMERICAN FORESTRY MAGAZINE, Washington, D. C. (7-9-22)

FOREST ENGINEER, a graduate with eight years experience as chief of timberland department of large Eastern paper manufacturing company is open for position with company operating Eastern spruce lands. Address Box 4055, care AMERICAN FORESTRY MAGAZINE, Washington, D. C. (8-10-22)

GRADUATE FORESTER, at present employed by a Timber and Land Development Company, desires position as Forester or Superintendent on Private Estate, or in Park work. Experienced in Tree planting and Pruning, the handling of Shrubbery, Fire Protection and Logging operations. A willing worker as well as equipped to direct others. Box 4060, care AMERICAN FORESTRY MAGAZINE, Washington, D. C. (9-11-22)

FORESTER, with ten years' experience as technical assistant and forest supervisor, now in charge of western National Forest, desires to make connection with commercial organization with opportunity of improving present position. Address Box 4065, care AMERICAN FORESTRY MAGAZINE, Washington, D. C.

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WANTED

WANTED—FORESTERS AND RANGERS to act as District Superintendents and book orders for fruit and ornamental trees, evergreens, shrubs, etc. Pay weekly. Complete equipment. State territory desired. Full or part time. Address Box 3090, care AMERICAN FORESTRY MAGAZINE, Washington, D. C. (4-6-22)

BARNJUM $5,000 AWARD

By the unanimous decision of the judges, Messrs. Gilbert, Howe, Piche and Wilson, the first prize of $2,000 offered by Frank J. D. Barnjum for a practical suggestion for the suppression of the spruce bud worm, bark beetle and borer, was awarded to Mr. O. Schierbeck, Forest Engineer for Price Bros., & Co., Limited, Quebec, whose paper on the subject was the best effort of the 230 presented. The balance of the prize, namely $3,000, was divided equally, or $1,000 each to Doctors Swaine, Craighead and Tothill, of the Forest Insect Branch of the Entomological Department as a reward for the untiring efforts of a small band of loyal, conscientious, overworked and underpaid government officials, who are giving the best years of their life for the suppression of the forest insect peril in Canada, and from the fact that much of the information contained in papers presented was based on the results of their good work. As no one paper qualified fully for the prize, Mr. Barnjum, with the hearty approval of the judges, felt this would be a generous disposition of the prize money. Much valuable information on this important subject has been collected which will be given to the world free with full credit to the authors, who deserve and will be accorded the earnest appreciation of the people of the whole continent, which is so seriously menaced by these insect pests.

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A discussion at length of the chief facilities and methods for the movement of the timber from stump to manufacturing plant, especially logging railroads.

PERPETUAL SUPPLY OF TIMBER

Progressive southern lumbermen, who are looking westward for future stands of timber as their own holdings become cut out, are showing great interest in the biggest offering of government timber ever made, says the Forest Service, United States Department of Agriculture.

The timber unit offered lies within the Malheur National Forest in Oregon and contains 890,000,000 feet of timber, 87 per cent of which is yellow pine. It is one of a group of logging units all tributary to Burns, Oregon, totaling 6,700,000,000 board feet. This forest region, government foresters say, will produce an annual cut of 60,000,000 feet for all time, thus insuring a continuous supply of raw material for the local lumber industries and steady employment for mills and woods workers. The opening up of the Malheur Forest presents an unusual chance for a new and permanent location for some company which is through in the South, say the foresters.

FEDERAL FUNDS AID STATES IN FIRE FIGHTING

Allotments of $400,000 of Federal funds to states cooperating with the government in protecting forest lands from fire have just been completed by the Forest Service, United States Department of Agriculture, according to District Forester George H. Cecil, of Portland.

This sum, together with not less than an equal amount to be supplied by the states cooperating, is expended jointly by the cooperating Federal and state foresters in protecting from fire forest lands at the headwaters of navigable streams. The allotment is made on a basis of timbered area and cost of adequate protection. The Federal expenditure in any state is restricted to not over $24,000.

This amount of money is insufficient to insure adequate forest fire protection, according to Mr. Cecil, but it has in connection with state funds, enabled substantial progress to be made in that direction. Due to the serious fire season this year in both Oregon and Washington, this cooperative fund has been drawn on heavily, foresters say.

Allotments to the various states are as follows:

Oregon, $24,000; Washington, $24,000; California, $22,750; Idaho, north, $21,000; Idaho, south, $2,300; Montana, $13,725; Maine, $24,000; New Hampshire, $8,425; Vermont, $4,200; Massachusetts, $8,400; Rhode Island, $625; Connecticut, $3,150; New York, $24,000; New Jersey, $5,050; Pennsylvania, $24,000; Maryland, $3,850; Virginia, $18,200; West Virginia, $10,500; North Carolina, $12,000; Tennessee, $11,700; Louisiana, $21,000; Texas, $13,000; Ohio, $1,050; Michigan, $24,000; Wisconsin, $15,000; Minnesota, $24,000; South Dakota, $100.

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SCHOOLS AND ROADS SHARE IN FOREST RECEIPTS

Governors of 28 states have just been notified that 25 per cent of the $3,421,531 received from timber sales, grazing permits, and other sources of National Forest revenue for the past fiscal year will be distributed by the Forest Service, United States Department of Agriculture. These moneys are returned to States in which National Forests are located for expenditure upon schools and roads.

An additional 10 per cent of the total receipts is transferred to the Forest Service for the construction of roads and trails within the forests. This sum for the present year amounts to $338,576.

The total, which aggregates over $1,000,000 will be prorated among the 28 states in proportion to the receipts from the National Forests within their borders. Since the establishing of the National Forests the sums returned to these states have steadily increased, amounting today to almost $14,000,000, which has been directly contributed to the development of the states by the National Forests within their borders.

California, where Federal timber lands returned to the Government $628,765 last year, leads the list and will receive $157,191 for the school and road fund and $62,876 for National Forest roads and trails. Oregon is second, while Idaho, Arizona and Colorado follow in the order named.

PRACTICAL COURSES FOR PRACTICAL MEN

The Madison Laboratory says that the course in Kiln Drying has been given 27 times with a total attendance of 292 men. The course in Boxing and Crating has been given 16 times with a total attendance of 143 men. The men who have taken these courses represented a large variety of interests and came from all parts of the country and even from foreign countries. These courses are of a practical nature; they are for industrial representatives and do not call for any educational requirements. The purpose of the Forest Service in offering them is to help the industries to get better results with more of the lumber they manufacture or buy. In this way not only will less timber need to be cut, but the profits resulting from efficient production will be greater than those derived from present wasteful methods. Many firms who have sent representatives to the Forest Products Laboratory for a week or two of study have stated that they were able to effect savings and improve the quality of their goods to the value of thousands of dollars annually.

SCENIC BEAUTY TO BE PRESERVED

Persons who wish to place advertising signs within the National Forests of Oregon and Washington must obtain permission from a forest officer, states District Forester George H. Cecil, at Portland, Oregon. The regulations governing the use of National Forest lands prohibit the mutilation, defacement or destruction of objects of natural beauty or of scenic value on such lands; and incidentally provide for legal action towards penalties for violation. Only those signs which are of distinct service to the traveling public and which are well constructed and sightly will be allowed. All persons who have already posted signs on National Forest land will be requested either to remove them, or else obtain written permission from a forest officer to continue them.

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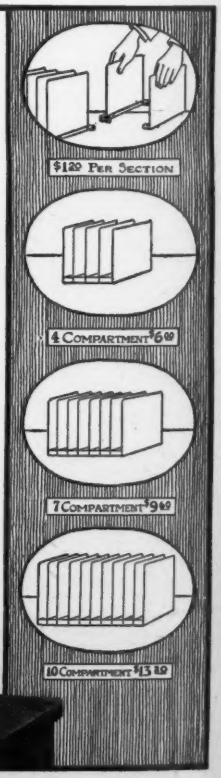

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